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THE TOXICOLOGY OF SALVARSAN:

DIOXYDIAMIDO-ARSENO-BENZOL (SALVARSAN OR KHARSIVAN).

BY

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AND

JOHN WEBSTER, F.I.C.,

ASSISTANT SCIENTIFIC ANALYST TO THE HOME OFFICE; DEMONSTRATOR OF PATHOLOGICAL CHEMISTRY TO ST. MARY'S HOSPITAL MEDICAL SCHOOL, LONDON, W.

Dioxydiamido-arseno-benzol dihydrochloride is the chemical name for a most valuable therapeutic remedy, and it is better known by the name "salvarsan," or "kharsivan"—the latter denoting the English preparation.

Salvarsan was introduced by Professor Paul Ehrlich in 1910, and neo-salvarsan in 1912. They were also known by the respective numbers "606" and "914," these denoting the numerical position of the compounds in the list of chemical substances prepared and experimented upon.

On the outbreak of war it was found desirable that dioxydiamido-arseno-benzol should be manufactured in this country. The preparation of this important remedy was satisfactorily carried out, and it was introduced under the name of "kharsivan." Before being placed on the market samples of kharsivan were submitted to careful chemical and physical tests, and these gave practically identical results with salvarsan.

Physiological and therapeutic tests were carried out by one of us (W. H. Willcox) at the request of the Board of Trade, and it was found that the English preparation was practically identical in its physiological and therapeutic effects with salvarsan. The toxic action of kharsivan was certainly not greater than that of salvarsan.

Kharsivan was then definitely introduced after the sanction of the Board of Trade had been received. The testing of kharsivan after its introduction was entrusted to the Medical Research Committee, who have submitted samples of every batch prepared to searching physiological and toxicological tests.

USES.

Syphilis.

Salvarsan, or kharsivan, has become definitely established as the most effectual remedy for the treatment of syphilis.

The recent discovery in 1905 of the causal agent of syphilis—namely, the *Spirochaeta pallida*—has enabled this organism to be demonstrated in the lesions associated with syphilis. The special serum test—the Wassermann reaction—published in 1906, enabled the presence of a syphilitic infection to be demonstrated in the blood serum, and in the cerebro-spinal fluid in cases where the central nervous system was involved.

The therapeutic effect of any antisyphilitic remedy can be definitely estimated by the application of tests for the presence of the specific organism in syphilitic lesions, and by the application of the Wassermann reaction to the blood serum.

It is by these tests that it has been definitely proved that salvarsan or kharsivan are the remedies which occupy the foremost place in the treatment and cure of syphilis.

It is unnecessary to emphasize the importance of these remedies from a prophylactic point of view, since the rapid destruction of the infective agent in the body means the prevention of spread of infection.

Other Spirochaete Infections.

Other spirochaete infections, such as relapsing fever in man, due to a spirochaete infection; recurrent fever in animals, due to spirochaetes; and spirillose infection of birds, respond equally well to the administration of salvarsan or kharsivan in proper doses.

Yaws is a disease due to a spirochaete infection, and this responds rapidly to treatment with salvarsan or kharsivan.

Mycosis fungoides and glandular conditions resembling syphilis have shown marked benefit after treatment with salvarsan or kharsivan.

Tertian malaria has been cured by the administration of these remedies, but *quartan malaria* does not seem to respond to treatment in the same way.

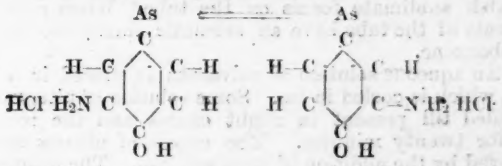
Salvarsan, or kharsivan, has been used with benefit in leukaemia, pernicious anaemia, lymphadenoma, trypanosomiasis, anthrax, psoriasis, and lichen planus, but the effect has not been of so marked a degree as in the spirochaete infections above named.

CONSTITUTION AND PROPERTIES.

Salvarsan, or kharsivan, has the chemical formula:

$$C_{12}H_{12}O_2N_2As_2(HCl)_2$$

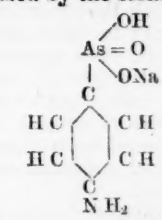
This may be expressed graphically thus:



Salvarsan is seen to be a complex compound of arsenic with the benzene nucleus.

It was evolved after a great deal of experimental work extending over a number of years. Koch had found that ordinary antiseptic drugs which were of high value outside the body were useless *in vivo* since they had as powerful a toxic action on the organism as on the parasite; or otherwise expressed, their organotropic action was equal to their parasitotropic action. Ehrlich endeavoured to find a drug which had as high a parasitotropic but as low as organotropic action as possible. He found that the best results were yielded by compounds of arsenic with the benzene nucleus.

Atoxyl was an example of one of these compounds. Its constitution is expressed by the formula:



Koch found that this drug was markedly parasitotropic in sleeping sickness, and that the organotropic action was low. He spoke highly of the value of atoxyl.

When atoxyl came to be extensively used on man it was soon found that the drug had a peculiar organotropic action in some cases, which completely contraindicated the use of the drug altogether. It had an organotropic action for the optic nerve and in some cases caused optic atrophy and complete blindness.

Further experiments on other compounds of arsenic and benzene led to the discovery by Ehrlich and his co-worker, Bertheim, of salvarsan; it was found to have a high parasitotropic action in the body and a very low organotropic action. Salvarsan had no organotropic action on the optic nerves. A peculiarity of salvarsan is that the parasitotropic action on spirochaetes is much greater in the body than *in vitro*.

Salvarsan at the time of its introduction was the drug which, of all remedies known, gave the highest parasitotropic action for spirochaetes combined with the minimum organotropic action.

The introduction of this valuable remedy marked an epoch in the treatment of syphilis, and it was found that no other known drug compared in efficacy with salvarsan and its derivatives.

Salvarsan is a powder of a pale yellow colour. It contains arsenic in amount equal to 34 per cent. expressed as the metal arsenicum, or 44.9 per cent. expressed as arsenious oxide (As_2O_3).

It is soluble in water (1 in 5), forming an acid solution. It is soluble in methyl alcohol (1 in 3), and in ethyl alcohol (1 in 12). It is also soluble in glycerine. If salvarsan is dissolved in water and caustic soda solution

is cautiously added a precipitate forms, which redissolves on the addition of slight excess of the alkali.

Salvarsan is very unstable and decomposes on exposure to the atmosphere. It is sold in hermetically sealed glass tubes, which contain an inert gas in addition to the powder. In aqueous solution salvarsan rapidly decomposes.

Chemical Tests.

1. An aqueous solution of salvarsan, when treated with a stream of H_2S gas, yields no precipitate of arsenic sulphide even after the addition of hydrochloric acid and warming. This shows the absence of inorganic arsenic.

2. An aqueous solution of salvarsan gives with either ferric chloride solution or with bromine water a brown colour, becoming a deep crimson in a few seconds.

3. Ignite the solid substance in a test tube: the substance melts and chars, whitish fumes are given off, and a blackish sublimate forms on the tube. When cool the contents of the tube have an aromatic smell, like that of nitrobenzene.

4. An aqueous solution of salvarsan is placed in a test tube, which is cooled in ice. Some solution of nitrous acid is added till present in slight excess and the mixture left for twenty minutes. The excess of nitrous acid is removed by the addition of urea solution. The solution is divided into two parts:

(*a*) To one part an alcoholic solution of alpha-naphthylamine is added; a beautiful violet colour results.

(*b*) To the other part an alcoholic solution of beta-naphthylamine is added. No vermilion colour is produced, showing the absence of atoxyl.

5. *Reinsch Test.*—Salvarsan if submitted to this test gives a definite reaction for arsenic. The fact that the arsenic is present in organic combination does not prevent the detection of arsenic by this test.

6. *Marsh-Berzelius Test.*—Salvarsan gives an unsatisfactory result, since the organic combination of the arsenic prevents its detection by this test.

In order that the Marsh-Berzelius test may be accurately employed, it is necessary for the organic compound to be broken up. This can be done by oxidation in the usual manner with nitric and sulphuric acid, or by means of hydrochloric acid and potassium chlorate. In this way the arsenic is converted to arsenic acid. The oxidized solution should be reduced by treatment with potassium meta-bisulphite and dilute sulphuric acid and the excess of sulphur dioxide boiled off.

This solution now contains the arsenic in the form of arsenious acid, which can readily be detected or estimated by the Marsh-Berzelius test.

7. *Mirror Test.*—For quantitative estimations of minute amounts of salvarsan the mirror yielded by a given quantity of salvarsan, or an organ containing it, is compared with a series of standard mirrors obtained from known amounts of arsenious oxide.

The electrolytic method of the Marsh-Berzelius test is much the most satisfactory for toxicological work.

Physiological Tests.

Animals on which these may be conveniently employed are white mice, white rats, and rabbits.

A solution of salvarsan in normal saline is taken, and a solution of caustic soda is added until the precipitate which forms just redissolves. This solution is made up to a strength of 1 per cent. (1 gram in 100 c.cm.) It is slightly alkaline in reaction, and is used for injection into animals.

Mice.—These animals are susceptible to the toxic action of salvarsan.

The maximum dose borne without a fatal result is for a mouse weighing 20 grams, about 0.004 gram—that is, 0.2 gram per kilo. Of the 1 per cent. solution, 0.4 c.cm. is injected subcutaneously under the skin of the back, and by gentle massage with a glass rod the liquid is dispersed. No fatal result should follow the injection, but larger doses will probably cause death. Smaller doses—for example, 0.3 c.cm. and 0.2 c.cm.—should also be given. They should not produce a fatal result.

Rats.—These animals are very convenient for the application of toxicological tests, since they are less delicate than mice as regards susceptibility to shock, and they are able to withstand larger doses per kilogram body weight.

For rats a curative dose in experimental spirochaete infections is 0.05 gram of salvarsan per kilogram body weight. In a rat weighing 100 grams a dose of salvarsan of 0 5 c.cm. of 1 per cent. solution—that is, 0.005 gram—causes no toxic symptoms. The solution is given subcutaneously as above.

In a rat weighing 100 grams a dose of salvarsan of 1.5 c.cm. of 1 per cent. solution—that is, 0.015 gram—is well borne and produces no toxic symptoms. (Dose= 0.15 gram per kilo.)

In a rat weighing 100 grams a dose of salvarsan of 3 c.cm.—that is, 0.03 gram—is borne without marked toxic symptoms. (Dose=0.3 gram per kilo.)

In the above experiments local sloughs may occur at the site of injection after a few days. These usually heal up.

Rabbits.—Doses of salvarsan of 0.2 gram per kilogram body weight are borne without toxic effect if given subcutaneously, though subsequent local sloughing is likely to occur. A dose of 0.1 gram per kilogram body weight is well borne if given intravenously.

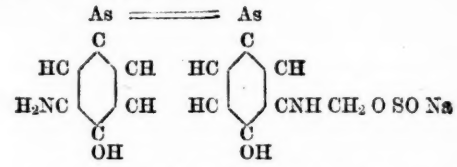
NEO-SALVARSAN.

This is a powder of a somewhat deeper yellow colour than salvarsan; it is less finely divided, and does not adhere to the sides of the capsule in which it is contained. It is more unstable than salvarsan, and its solution quickly decomposes, especially if heated.

Solutions of neo-salvarsan should be made in distilled water or in a weak saline solution (0.4 per cent.) and the temperature of the solution should not exceed 20° to 22° C.

Neo-salvarsan forms a neutral solution, and alkali should not be added to it before use.

Neo-salvarsan is salvarsan acid sodium formaldehyde sulphoxylate. It has the formula:



Owing to the addition of the further chemical group in salvarsan, neo-salvarsan contains a lower percentage of arsenic. A dose of salvarsan must be multiplied by $\frac{3}{4}$ in order to get the corresponding dose of neo-salvarsan.

Thus 0.6 gram of salvarsan corresponds to 0.9 gram of neo-salvarsan.

Neo-salvarsan has the same physiological and therapeutic effects as salvarsan. The addition of the further chemical group to salvarsan considerably adds to the convenience and facility of administration without altering the therapeutic action of the new compound.

MODE OF ADMINISTRATION OF SALVARSAN AND NEO-SALVARSAN.

Subcutaneous and also intramuscular injections of solutions of these compounds were used, but a long experience has shown that intravenous injections are far preferable. They are more efficacious and attended with less risk if carefully given. There is much less pain and discomfort with intravenous than with the other modes of injection.

Subcutaneous and intramuscular injections are always associated with a good deal of local discomfort or pain, and in the experience of one of us (W. H. W.) local necrosis of the tissues at the site of injection is by no means uncommon. Also local inflammatory troubles may follow a subcutaneous or intramuscular injection; thus, one case in which an injection of salvarsan was given in the subscapular region developed a local pleurisy, with effusion at the site of the injection. This case was seen by one of us (W. H. W.).

Suspensions of salvarsan or neo-salvarsan in oily liquids have been recommended, but the absorption of the drugs in this mode of administration is uncertain and local troubles may follow, so that this method is certainly less desirable than the intravenous mode of administration.

Preparation of Solutions.

For Intravenous Injections.

Salvarsan.—Salvarsan 0.6 gram is placed in a sterile glass flask containing 40 c.cm. of 0.5 per cent. sterile saline solution. The powder quickly dissolves on shaking. Some solution of pure caustic soda (15 per cent.) is added cautiously drop by drop until the precipitate which forms just redissolves. About 20 to 23 minims of the solution will be required. The liquid is now made up to 300 c.cm. with 0.5 per cent. saline solution. This solution is used for injection into a vein, the usual precautions being taken to prevent entry of air or escape of the arsenical solution into the subcutaneous tissue round the vein.

Neo-salvarsan.—Neo-salvarsan 0.9 gram is placed in a sterile flask, and 150 c.cm. of specially pure sterile normal saline (0.4 per cent.), of temperature not exceeding 22° C., are added. The neo-salvarsan readily dissolves, and the solution is ready for injection with the usual precautions.

For Intramuscular or Subcutaneous Injections.

Salvarsan 0.6 gram is triturated in a sterile mortar with 20 minims of a 15 per cent. caustic soda solution, 15 c.cm. of sterile distilled water are added, and one or two drops more of the caustic soda solution, if the liquid is not quite clear.

Neo-salvarsan 0.9 gram is dissolved in 18 c.cm. of sterile distilled water.

Precautions should be taken as to the purity of the distilled water used in the preparation of the saline solution and for dissolving the salvarsan or neo-salvarsan. The water should be freshly distilled and kept under perfectly aseptic conditions until required. It has been shown that if distilled water contains bacteria, the sterilization of it, while killing the bacteria, does not destroy the toxins present in them, and such water may cause a rise of temperature on intravenous injection quite apart from any toxic action of the salvarsan or neo-salvarsan.[1]

Symptoms Following an Intravenous Injection of Salvarsan or Neo salvarsan.

Slight Symptoms.

The patient should be resting in bed during the injection and for twenty-four hours afterwards. With this precaution in a number of cases no symptoms of any kind occur.

It is common, however, for slight symptoms to occur, although every care may have been taken in the preparation and administration of the solution. Thus, nausea for a few hours after the injection and occasionally vomiting are common. A rise of temperature of one or two degrees Fahrenheit, within a few hours of the injection is common. Slight headache often occurs, but this in most cases is probably the result of the rise of temperature. A slight diarrhoea—for example, two or three actions of the bowels within twenty-four hours of the injection—is not uncommon.

The above symptoms are all that occur in the great majority of cases.

Slight albuminuria for one or two days after an injection has occurred on rare occasions.

Thrombosis in the course of the vein into which the injection has been given is of rare occurrence, but has been seen by one of us (W. H. W.).

Marked pyrexia occasionally follows an injection—for example, a rise of three or four degrees Fahrenheit or even more. This may last for a few days without other marked symptoms. It has been suggested that this rise of temperature is due to the endotoxins liberated by the destructive action of the salvarsan on the spirochaetes in the body.

Shock during, or immediately after, an injection has occurred, but is very uncommon. In a recent case a fatal result occurred during the course of an injection, although every care had been taken.

Severe Symptoms.

These are of two types:

I. *Symptoms of Arsenical Poisoning.*

Very occasionally symptoms of acute arsenical poisoning follow an injection of salvarsan. Thus some shivering or a rigor may follow an injection; there will be a rise of temperature; headache and some pains in the limbs, nausea and vomiting, with furred tongue and diarrhoea, may occur. The conjunctivae are injected, and in some cases subconjunctival haemorrhages occur. An erythematous rash and slight jaundice occur in these cases. The patient becomes somewhat delirious, and stupor may supervene. The urine contains albumin and some granular casts, and traces of bile are present in cases with jaundice.

II. *Symptoms of Profound Toxaemia.*

This is the type of case which is usually attended with a fatal result.

Details of the symptoms are given in some of the cases enumerated below. Within three days of the injection of salvarsan dangerous nervous symptoms supervene—for example, collapse and abnormal mental condition. In one case acute pain in the abdomen and pain at the back of the neck were complained of. The patient becomes stuporose with twitchings of the muscles, and epileptiform convulsions are likely to occur. Coma intervenes, with collapse and death. The pupils are often dilated and the reflexes absent. The prognosis is very grave in cases of this type. The urine is usually markedly diminished in quantity and contains albumin and casts.

The *pathology* of cases of this kind is difficult to understand. After careful consideration it appears that the symptoms are really due to a profound autointoxication, such as occurs in uraemia. This view is borne out by the occurrence of degenerative changes in the liver, heart, and kidneys which are found on *post-mortem* examination in these cases.

The symptoms are not to be explained by anaphylaxis due to the setting free of endotoxins consequent on the destruction of spirochaetes, since the latent period (three days or more) in some of the cases is quite incompatible with this explanation.

Most of the deaths from salvarsan or neo-salvarsan are of this type, and it is important that every safeguard should be taken to avoid catastrophes of this nature.

Post-mortem Signs in Cases of Death after Salvarsan.

There is little of a definite nature to be found in these cases beyond degenerative changes of a fatty nature, or cloudy swelling, in the heart, liver, and kidneys. In some cases death has been due to a local lesion—for example, haemorrhage from a cerebral vessel.

Excretion of Salvarsan and Toxicological Analyses.

After an injection of salvarsan arsenic is found in the blood. Thus, one hour after the injection of 0.6 gram there was found respectively in two cases $\frac{1}{2}$ mg. and $\frac{1}{3}$ mg. of arsenic (calculated as As_2O_3) in 100 c.cm. of blood serum. The blood clot was found to be almost free of arsenic, this being found only in the blood serum.

Salvarsan is excreted mainly by the kidney and bowel. Arsenic is present in the urine and faeces for at least three weeks after an intravenous injection.

In cases of death after salvarsan arsenic is found in the abdominal viscera—for example, spleen, kidney, liver, suprarenal glands, etc. It is also found in small amounts in the muscles and blood.

A most interesting feature is that arsenic seems to be almost entirely absent from the brain and nervous system, so that the symptoms of profound toxaemia in cases of salvarsan poisoning are certainly not due to the action of the arsenic as such on the central nervous system.

Salvarsan in Lactation.

To investigate the influence of salvarsan on the milk of a lactating woman to whom the drug has been administered, the milk from a woman to whom two intravenous injections of salvarsan were given was collected. The first specimen was taken 72 hours after the first injection (0.4 gram) had been given; the second specimen was collected 12 hours after the second injection, of 0.5 gram. Both of these specimens were found to be free from arsenic.

In a second woman to whom 0.5 gram of salvarsan had been given, samples of milk were collected 5½ hours, 10½ hours, 16 hours, 36 hours and 60 hours respectively after the injection. Arsenic was entirely absent from all these samples, though the most delicate tests were employed.

It thus appears certain that the benefits resulting in a

syphilitic baby who is suckling from an infected mother, to whom salvarsan is given, cannot be due to the presence of salvarsan in the milk ingested by the baby. Any improvement in the child's health in such a case is to be explained on other grounds—for example, the presence of antibodies in the mother's milk, consequent on the destruction of spirochaetes in her body as a result of her injection of salvarsan.

PRECAUTIONS IN THE ADMINISTRATION OF SALVARSAN.

It must be remembered that salvarsan and neo-salvarsan are compounds having a powerful therapeutic action, and that in some patients, in spite of all precautions that may be taken, certain toxic symptoms will develop.

The susceptibility to salvarsan of patients with sound bodily organs and in good health undoubtedly varies very much, and in a susceptible person an average dose of salvarsan may produce alarming and even dangerous symptoms. Fortunately this idiosyncrasy to the effects of salvarsan is not common in healthy people.

CONTRAINDICATIONS.

Renal Disease.

Renal disease is a contraindication to the use of salvarsan. A careful clinical examination for symptoms of the condition should be made, and also a careful examination of the urine should be carried out. It is important to note the daily quantity of urine excreted, the specific gravity, the percentage and daily quantity of urea and chlorides, and especially the presence of albumin or casts. Renal inadequacy as shown by a low figure for urea and chlorides adds to the risk of toxic symptoms from salvarsan. The presence of albumin and casts in the urine will usually be a contraindication for the administration of salvarsan. The important question to be considered is the excretory efficiency of the kidney, and if this is poor, then, generally speaking, salvarsan should be avoided if possible.

In cases of albuminuria due to pyelitis or cystitis salvarsan may be given, provided that the renal excretion is good. The same view holds also with cases of functional or physiological albuminuria. There is undoubtedly risk in giving salvarsan in cases of acute and subacute nephritis, and also in parenchymatous and chronic interstitial nephritis.

In cases of albuminuria due to nephritis of syphilitic origin very careful consideration is necessary before salvarsan should be given. There is bound to be some risk, but the call for an efficient remedy to deal with an obstinate condition of this kind may be so great as to more than counterbalance the risk. It is always wise in these conditions to give a small dose of salvarsan—for example, 0.3 gram for an adult. This dose may be repeated in four weeks, and it may be increased if the first dose was well borne.

Circulatory System.

Where there is advanced heart disease and failure of compensation, salvarsan is contraindicated. The presence of a valvular lesion, provided that compensation is well maintained and the condition of the patient good, is not necessarily a contraindication.

In advanced degenerative conditions of the heart muscle there is risk of syncope from shock, and salvarsan should be avoided. In conditions of advanced arterio-sclerosis it is wise to avoid the use of the drug.

Respiratory System.

Serious bronchial conditions—for example, septic forms of severe bronchitis—are contraindications.

Nervous System.

Salvarsan is usually contraindicated in advanced degenerative conditions of the central nervous system. In meningitis of syphilitic origin the drug should be used with great caution, and should never be given in more than half doses.

Salvarsan has been used recently in the treatment of tabes and general paralysis of the insane. As a rule, the intravenous administration of the remedy does not directly do good except in early cases. The reason for this is that when salvarsan is administered intravenously the drug is not excreted by the choroid plexus and does not penetrate to the cerebro-spinal fluid, which remains free from arsenic.[2]

In order to overcome this difficulty, cases of tabes and general paralysis of the insane have been treated by giving salvarsan intravenously, afterwards withdrawing blood from a vein—for example:

(1) At an interval of an hour or so; or
(2) After an interval of a few days.

The serum is separated under aseptic conditions, and is injected into the spinal canal by lumbar puncture. In the former case (1) the serum will contain a small amount of salvarsan. In the latter case (2) the serum will contain perhaps a trace of salvarsan, but also antibodies.

Both methods have been attended with much greater success than the mere intravenous administration of salvarsan.

It is difficult to say whether the benefit from spinal injection of salvarsanized serum is due to direct action of salvarsan in the serum on the affected nervous tissues or to the action of the antibodies present. Probably both have an important beneficial action.

In cases in middle or advanced life, where there is a certain amount of arterio-sclerosis present and the blood gives a positive Wassermann reaction, the question often arises whether salvarsan should be administered. In cases of this kind it is well to avoid the use of the drug unless there is definite and unmistakable evidence of an active syphilitic lesion.

The presence of a positive Wassermann reaction, apart from any active syphilitic lesion, is not, in our opinion, a sufficient justification for the use of salvarsan in these cases.

The presence of any serious disease of any kind should always call for the greatest consideration before a full dose of salvarsan is given. It must be remembered that there is bound to be risk of the development of serious toxic symptoms.

INTERVALS BETWEEN SUCCESSIVE DOSES.

Toxicological analyses show that a full dose of salvarsan (0.6 gram) is not completely excreted after three weeks. Probably by this time only minute traces remain in the body.

We are strongly of opinion that an interval of four weeks should elapse between the administration of full doses of salvarsan. With shorter intervals there is risk of a cumulative action, since the second dose may be given while some of the former dose still remains in the abdominal viscera.

TREATMENT OF SALVARSAN TOXAEMIA.

Prophylactic treatment is most important.

An aperient should be given the night before the remedy is administered. Alcohol and tobacco should be avoided for twenty-four hours before and after the administration. The patient should remain in bed on the day in which the drug is given, and for twenty-four hours afterwards.

Slight symptoms—such as nausea, slight pyrexia, headache, etc.—call for nothing but the simplest remedies. Should the temperature remain above normal for more than a few hours, the patient should remain in bed until it has reached the normal line and remained there for twenty-four hours.

It is wise to diet patients carefully until all symptoms have cleared up. The diet should be light—for example, milk, milk puddings, fruit, vegetables, toast, bread, etc. Meat, meat extracts, soups, and alcohol should be avoided. Constipation should be avoided by giving suitable aperients.

Where serious symptoms occur—such as collapse, twitchings, stupor or delirium or coma—an intravenous injection of normal saline (2 to 3 pints) should be given, and repeated if necessary. Normal saline may also be given subcutaneously with advantage. Rectal injections of normal saline, containing 3 drachms of sodium bicarbonate to the pint, should be given every eight hours. Where the blood pressure is not low venesection should be done, and about 10 oz. of blood withdrawn. This should be followed by the giving of saline into the vein.

If the patient becomes comatose, it is important to continue nourishment by the mouth—for example, 15 oz. of peptonized or citrated milk should be given by a stomach or nasal tube every six hours. For collapse,

strychnine (gr. $\frac{1}{30}$) may be given hypodermically every four hours, and oxygen, or oxygen passed through alcohol, may be administered with advantage.

In the early onset of toxic symptoms the following mixture should be given:

Sodium citrate	ʒj
Sodium bicarbonate	ʒss
Potass. citrate	ʒss
Caffeine citrate	gr. iij
Syr. aurant.	ʒj
Aq.	ad ʒj

Every three hours.

TOXICOLOGICAL ANALYSES AND CASES.

I. *Analyses of Urine and Fæces.*

CASE I.—P. L. June 2nd, 1911, 0.6. gram salvarsan given.

	Milligrams of Arsenic per 100 Grams. Urine.	Fæces.
June 3	1.0	1.4
June 5	1.0	2.5
June 7	0.17	1.7
June 9	0.17	
June 10	0.07	

CASE II.—H. 0.5 gram salvarsan given October 12th, 1914.

No. of Days after Salvarsan.	Milligrams of As_2O_3 in 100 c.cm. Urine.
4	0.3
7	0.3
10	0.15
13	0.03

CASE III.—C. 0.5 gram salvarsan given October 14th, 1914.

No. of Days after Salvarsan.	Milligrams of As_2O_3 in 100 c.cm. Urine.
2	0.2
5	0.2
8	0.15
11	0.05

CASE IV.—G. 0.5 gram salvarsan given October 12th, 1914.

No. of Days after Salvarsan.	Milligrams of As_2O_3 in 100 c.cm. Urine.
2	0.4
4	0.2
7	0.2
10	0.15
13	0.1

CASE IV (*continued*).—0.5 gram salvarsan given October 29th, 1914.

No. of Days after Salvarsan.	Milligrams As_2O_3 in 100 c.cm. Urine.
4	0.4
7	0.4
10	0.2
13	0.1
16	0.03
21	0.025

CASE V.—T. 0.5 gram salvarsan given November 11th, 1914.

No. of Days after Salvarsan.	Milligrams As_2O_3 in 100 c.cm. Urine.
3	1.33
5	0.8
8	0.33
11	0.12

CASE VI.—F. 0.5 gram salvarsan given October 12th, 1914.

No. of Days after Salvarsan.	Milligrams As_2O_3 in 100 c.cm. Urine.
2	1.33
4	0.4
7	0.16
10	0.11
13	0.023

II. *Analysis of Milk.*

CASE I.—This was kindly sent by Dr. McIntosh and Dr. Fildes, of the London Hospital. The mother was suffering from ulceration of the throat and a macular rash of two months' duration. Her child, aged 5 months, had a rash on the body and well-marked enlargement of the spleen. On March 13th, 1911, the mother received 0.4 gram salvarsan intravenously, on March 16th 0.5 gram salvarsan intravenously, and on March 21st 0.6 gram salvarsan intramuscularly. The child was suckled all the time.

All symptoms of syphilis in the mother and child rapidly cleared up within five days of the second injection.

Analysis of samples of milk from the mother taken

(*a*) Seventy-two hours after the first injection,
(*b*) Twelve hours after the second injection,

showed in the first case (*a*) the merest trace of arsenic—0.006 mg. of As_2O_3 per 100 c.cm. milk. In (*b*) no trace of arsenic was present.

CASE II.—B. A mother suffering from syphilis received on March 8th, 1912, 0.5 gram salvarsan given intravenously, on March 27th 0.6 gram, and on April 17th 0.6 gram.

Samples of milk were collected: (*a*) Five and a half hours, (*b*) ten and a half hours, (*c*) sixteen hours, (*d*) forty hours, and (*e*) eighty-eight hours after the first injection. All of these samples were entirely free from arsenic.

III. *Analyses of Blood.*

CASE I.—"S.," kindly sent by Dr. A. Fleming, May, 1914; 0.6 gram salvarsan given intravenously. Blood taken one hour after injection. On analysis 0.33 mg. of arsenic (As_2O_3) were found in 100 grams of blood.

CASE II.—"B.," kindly sent by Dr. A. Fleming; 0.6 gram salvarsan given intravenously July 1st, 1914. Blood drawn off one hour after injection. The serum was separated from the clot. In 100 c.cm. of serum 0.5 mg. of arsenic (As_2O_3) were found. The clot contained no arsenic.

IV. *Cases in which Death occurred after the Administration of Salvarsan or Neo-salvarsan.*

CASE I.—A. E., aged 12. Case of congenital syphilis with ascites and cirrhosis of liver. Salvarsan was given, 0.3 gram on September 1st, 1911, and 0.3 gram on September 8th, 1911. The patient died on September 16th, 1911. Death was not accelerated by the administration of the salvarsan, since this was given as a last resort, the condition of the patient being hopeless before its administration. The liver contained arsenic corresponding to 2.5 mg. per 100 grams.

CASE II.—A female, aged 23, suffering from secondary syphilis. Given 0.4 gram salvarsan on November 30th, 1911, and 0.4 gram on December 4th, 1911.

A rise of temperature occurred after the first injection, and also after the second. On December 7th epileptiform convulsions occurred, and coma supervened. The urine contained much albumin, death occurring on the same day after a few hours.

Post-mortem examination showed fatty degeneration of the heart muscle, and cloudy swelling, with focal necrosis of the liver. Analysis showed that the liver contained arsenic in amount corresponding to 0.83 mg. per 100 grams.

CASE III.—A patient suffering from symptoms of syphilitic meningitis. On admission to hospital on August 28th, 1912, he was stuporose. He complained of headache and pain at the back of the neck. Vomiting occurred. There was ptosis of the right eyelid, and weakness of the right side of the face. Both plantar reflexes were extensor. The Wassermann reaction of the blood was positive; that of the cerebro-spinal fluid negative. On August 30th 0.5 gram of salvarsan was given intravenously. Collapse occurred four hours after, and death twenty-nine hours later.

Post-mortem examination showed that death was due to haemorrhage from a small aneurysm of the basilar artery. Analysis showed that in the liver arsenic was present in amounts corresponding to 4 mg. per 100 grams; in the brain only a mere trace was present—0.01 mg. per 100 grams.

CASE IV.—G. Tertiary syphilis. In January, 1913, 0.4 gram of salvarsan was given intravenously; there was some collapse a few hours after, but the patient recovered quickly, and was well in twenty-four hours. On July 26th, 1913, 0.4 gram of salvarsan was given intravenously; the patient was quite well after twenty-four hours, but on July 30th, 1913, the patient was seized with acute abdominal pain and pain at the back of the neck at 10 a.m. At 12.30 p.m. he was comatose and collapsed; at 5.45 p.m. he was in the same condition, with some oedema of legs. Death occurred at 9 p.m.

A *post-mortem* examination was made by Dr. Salusbury Trevor, and the case was regarded as one of salvarsan poisoning.

CASE V.—Tertiary syphilis with gummata of legs. 0.6 gram salvarsan given on May 9th, 1914, caused no toxic symptoms. On May 23rd 0.6 gram salvarsan given; a rise of temperature and shivering occurred in the evening. On May 25th aphasia occurred, and later coma supervened, with convulsions and death at 10 p.m.

Post-mortem examination by Dr. Spilsbury showed some thickening of pia mater and arachnoid membrane in the brain. The heart showed very advanced fatty degeneration. A small gumma was present in the lower lobe of the left lung. The liver showed advanced fatty degeneration of the cells in the centre of the lobules. The kidneys were enlarged and showed cloudy swelling.

Analysis showed:

Liver: 1.1 milligrams of arsenic as As_2O_3 per 100 grams.
Kidney: 0.2 milligram of arsenic per 100 grams.
Spleen: 2 milligrams of arsenic per 100 grams.
Brain: No arsenic present.
Spinal Cord: No arsenic present.
Stomach Contents: 0.08 milligram of arsenic (As_2O_3) per 100 c.cm.
Aorta: 0.025 milligram of arsenic per 100 grams.

CASE VI.—M. H., aged 19 (London Hospital case).

On January 3rd, 1913, salvarsan 0.6 gram was given. On January 9th the patient vomited and became comatose; death occurred on January 12th.

Analysis showed;

	Milligrams of Arsenic (As_2O_3) per 100 grams.
Small intestine	0.1
Large intestine	0.11
Liver	0.16
Kidney	0.13
Spleen	0.17
Spinal cord	? Trace.

CASE VII.—Specimens kindly sent by Dr. McIntosh and Dr. Fildes. The patient had suffered from acute meningo-

encephalitis of syphilitic origin. On May 26th, 1913, epileptiform convulsions and coma occurred. May 29th, 0.9 gram of neo-salvarsan was given. Collapse occurred three and a half hours later, and death in four and a half hours.

Analysis showed:

	Milligrams of Arsenic per 100 grams.
Liver	0.8
Kidney	1.0
Bone	0.07
Muscle	0.06
Blood	0.05
Brain	0.02

CASE VIII.—Dog, weight 24 lb. 3 oz. Neo-salvarsan 0.3 gram was given, and the animal killed twenty-four hours later. Specimens kindly sent by Dr. McIntosh and Dr. Fildes. Arsenic (As_2O_3) was found in the organs as follows:

	Milligrams of Arsenic per 100 grams.
Liver	1.0
Kidney	0.4
Muscle	0.08
Blood	0.1
Brain	Trace only
Bone	Trace only

CASE IX.—Specimens kindly sent by Dr. McIntosh and Dr. Fildes. The patient was admitted to hospital suffering from secondary syphilis and acute nephritis on May 27th, 1913. On June 20th 0.9 gram neo-salvarsan was given; no ill effects followed. On June 27th 0.9 gram neo-salvarsan was given. On June 29th there was severe headache; on June 30th restlessness and drowsiness; on July 1st convulsion, coma, and death.

Analysis showed the presence of arsenic in the organs as follows:

	Milligrams of Arsenic per 100 grams.
Liver	0.2
Kidney	1 55
Muscle	0.03
Blood	0.02
Brain	Trace only
Bone	Trace only
Suprarenal gland	? Trace
Skin	Nil
Aorta	Nil

It is interesting to note that in this case, in which acute nephritis was present, a very high relative percentage of arsenic was found in the kidney.

CASE X.—Specimens kindly sent by Dr. McIntosh and Dr. Fildes. An infant, aged 3 weeks, suffering from severe symptoms; there was a marked nummular eruption on the arms and legs, and pemphigus was present on the hands and feet. There was ulceration and discharge from the nose. On March 28th, 1911, salvarsan 0.02 gram was given; on March 30th 0.04 gram; and on March 31st 0.04 gram, on each occasion intravenously. Death occurred on April 1st, 1911.

Analysis showed the presence of arsenic in the organs as follows:

	Milligrams of Arsenic (As_2O_3) per 100 grams.
Liver	0.4
Kidneys	0.49
Spleen	0.39
Suprarenal gland	0 17
Lung	0.03
Brain	Absent

For kindly co-operation and help in the work detailed in this paper we are greatly indebted to Dr. J. McIntosh and Dr. Paul Fildes, of the London Hospital; to Dr. B. H. Spilsbury, of St. Mary's Hospital; and to Dr. A. Fleming, of St. Mary's Hospital, London.

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MAJOR W. L. KELLER, Medical Corps, U.S.A., has, we learn from the *Military Surgeon* for February, sent to the Surgeon-General of the United States Army a communication in which he says that he treated many varieties of sciatica during the past year, and has found no treatment so useful as the injection of novocain into the sacral canal through the hiatus sacralis; 4 c.cm. of a 5 per cent. solution was dissolved in 100 c.cm. of normal salt solution and sterilized by boiling. The patient was placed in the knee-chest position, and the region of the sacrum and coccyx rendered sterile by iodine. A needle from 6 to 10 cm. long, attached to a large glass syringe, was used to inject from 60 to 120 c.cm. of the solution. One injection gave absolute relief in the majority of cases, but three or four might be required. The effect was immediate, and the patient could usually walk without pain or limping when he left the table.

A CASE OF GAS GANGRENE EXHIBITING UNUSUAL PROOFS OF A BLOOD INFECTION.

BY

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THIS case is reported because it presented, in an unusual and convincing way, proofs of the occurrence of a blood infection with gas-forming organisms. No similar case has occurred in our considerable experience of gas gangrene, nor have we heard of any other like it. The essential facts may be given at once:

Private ——, Argyll and Sutherland Highlanders, was wounded late at night on March 18th, 1915, by a bullet which entered the right arm, fracturing the humerus. Gas gangrene developed in this wound on March 21st—that is, two and a half days after the injury. As the man passed through a field ambulance on March 19th he received the usual antitetanic injection below the left nipple, and was thereafter evacuated at once to a casualty clearing station. On March 20th he complained of pain at the site of the serum inoculation, and by March 21st a definite patch of gas gangrene had appeared there. On March 20th, the day after admission to the casualty clearing station, a hypodermic injection of pituitrin was made into the left forearm to combat collapse. By March 22nd the site of this puncture showed also an area of gas gangrene.

From these three places (right arm, left pectoral region, and left forearm) and also from the blood the same type of gas-forming organism was isolated by cultures made on March 22nd. This organism was of the "malignant oedema" type, most of the bacilli showing central spores.

The arm was amputated on March 24th, and the man made a good recovery, being evacuated to the base on March 27th. Subsequently information was received that he made good progress for some time, but later developed "pneumonia," from which he died on April 17th, a month after the original wound.

A brief account of the clinical features and the bacteriological findings are given below, in detail, to complete the record of the case.

The important facts in this case seem to be:

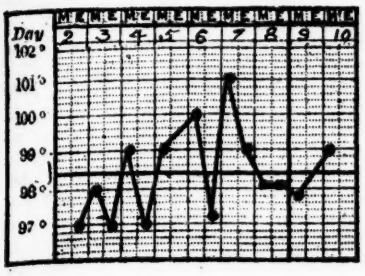
1. The rapid appearance of gas gangrene at three distant sites in the body. It is evident that the slight local injuries caused by the antitetanic injection at the field ambulance and the hypodermic injection of pituitrin at the casualty clearing station, offered suitable foci for organisms circulating in the blood stream to come to rest and develop.

2. Bacteriological evidence was obtained of what had been proved to us in nature—namely, that the gas-forming organisms had invaded the blood stream.

3. The fact that the man recovered from this severe infection sufficiently to be transferred to the base three days after the arm was amputated is in itself remarkable.

Private ——, Argyll and Sutherland Highlanders, was wounded in the right arm on March 18th, 1915, and admitted to a casualty clearing station next day. When admitted he was in a state of profound collapse and almost pulseless. The bullet had entered the back of the right upper arm, and emerged in front and to the inner side, making a large ragged wound. The humerus was fractured, and the brachial artery torn across. Antitetanic serum had been injected at a field ambulance before admission. On the following day he was rather better, and the wound was thoroughly syringed out with peroxide solution. Towards evening he collapsed again and became almost pulseless. The wound was dressed, and at this time showed no definite evidence of gas gangrene. Although somewhat delirious, he now began to complain of pain in the left pectoral region, where the antitetanic injection had been given. Next morning a little crackling was felt over this area, but this was at first put down to air having, perhaps, been injected along with the serum. Owing to the collapse, he was given during the night a hypodermic injection of pituitrin into the left forearm. On March 21st his general condition was unchanged, but a large patch of gas gangrene was now evident on the inner side of the right arm and forearm, below the exit wound. Another patch of gangrene was also found on the left side of the chest, including the area of the antitetanic injection. Both gangrenous areas were freely incised and dressed with peroxide solution. The affected area on the chest wall

included skin and subcutaneous tissue only, the structures below the deep fascia not being invaded. On March 22nd he was not so well, and a further patch of gas gangrene had appeared on the outer side of the left forearm, where the pituitrin had been injected. This new area was incised, and treated as in the other cases. Cultures from all three wounds, and also from the blood, were made on this day (*vide infra*).



He now began to improve, in spite of a certain amount of spread of the gangrenous condition on the left chest into the axilla, which necessitated further incisions. The right arm was amputated above the wound on March 24th, after which the man made a good recovery, being strong enough to be evacuated to the base on the 27th.

The following are the details of the bacteriological examination:

Films were made from all three wounds, and stained by Gram's method. In all the films bacilli of malignant oedema type, showing central spores, were recognized, along with a variety of other organisms. Cultures were made from all three wounds and from the blood in the following media:

1. Shake culture in large tubes of glucose agar.
2. Broth cultures made partly anaërobic by placing a wad of cotton-wool, soaked in a mixture of pyrogallic acid and caustic soda, in the tube below the rubber stopper.

By both of these methods growth was readily obtained of an organism, which later showed central spores, and was morphologically identical with the bacillus of malignant oedema. The same organism was obtained in the cultures from all the wounds, and from the blood as well. As regards the blood, 5 c.cm. of which was used to inoculate the tubes, the broth culture yielded the better result. In all the glucose agar tubes inoculated there was marked production of gas, splitting up the medium.

We are indebted to Major H. Rogers, R.A.M.C., for permission to record this case.

AMPUTATIONS AT BASE HOSPITALS IN FRANCE.

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FROM time to time letters have appeared in the medical press from surgeons at home criticizing the methods of their surgical *confrères* on this side the Channel, and no small share of this criticism has fallen on the flush amputation. Nevertheless, this method, after a run of eighteen months, is still the operation of choice in the class of case for which it came into use—severe sepsis threatening life. Our methods, especially in cranial and joint surgery, have varied from time to time, and the pendulum has swung to and fro between the radical and conservative, but our methods of amputation in cases of severe sepsis have throughout been governed on "coalition" lines: radical in the relief of sepsis and gangrene, conservative in saving life.

Flush Amputation as a Life-saving Device.

The flapless or flush amputation, the method of Antyllus, was revived in this war as a life-saving device, to deal with a special class of case seldom seen in civil life (emphysematous gangrene), because it was found to be the most efficient method, and not because of the ease of its performance, as some critics have suggested. In dealing with these cases, when amputation is decided on, three main points have to be kept in view:

1. To keep the patient alive during and after the operation.
2. To perform an operation which will check the spread of infective gangrene and prevent septicaemia.
3. To save as much of the limb as possible.

Gas Gangrene in Civil Practice.

In civil practice, amputations for crushed and mangled limbs are usually performed early, before the onset of serious sepsis, and can in most instances be conducted on orthodox lines, without the prospect of re-amputation. In rare instances, however, acute spreading traumatic gangrene follows rapidly on fractures of the "run over by motor bus" variety. The infection is then usually streptococcal and anaërobic, with the formation of gas. Emphysematous gangrene, once it commences in the damaged tissues, spreads like lightning Immediate amputation is required to save life, and any attempt to secure primary union will not only be useless but probably fatal. Anyone who has met with a case like this in civil practice must have been profoundly impressed.

Gas Gangrene in Gunshot Wounds.

"Gas gangrene" following gunshot wounds in this war, instead of being a rare occurrence, as in civil practice, is quite common. The onset and progress of the gas distension of a limb which precedes the gangrene is rapid beyond belief, unless seen.

In one case of wound of the thigh under our care, within six hours of the first signs of the onset, gas had extended up to the axilla and down to the ankle.

In another case of a wound in the region of the great trochanter, at 9 p.m. the wound (which had been freely laid open) showed no signs of gas. In under ten hours the man was dead, having suffered much agony, and the opposite thigh, which was uninjured, was blown up with gas to an enormous size.

The toxaemia is so fatal as to be unparalleled. Within a few hours of the onset of physical signs of gas, extensive gangrene may develop in the wounds, and life will hang upon the slender thread of an immediate and rapid amputation, with the minimum of shock.*

As the gas distends the fascial planes, pain becomes very severe, and the limb may swell to an enormous size, but with the onset of gangrene the pain usually disappears. The mental faculties may remain unclouded (despite profound toxaemia) on the very threshold of death.

When infection becomes general, on auscultation, gas may often be heard circulating in the heart, like the sound of a boiling kettle. This gives rise to great distress, and often to a sallow, contorted, almost tetanic facies. Extreme pallor is a marked feature of general infection. This may come on so suddenly as to raise the suspicion of internal haemorrhage, and I have known a tourniquet applied to a thigh (where there was no wound of exit) until the diagnosis could be cleared up. A general infection is usually fatal from cardiac failure or gas embolism. After death not only the damaged limb but the entire body, including the great veins, liver, etc., may be distended with gas.

With this pitiful picture surgeons in France are only too familiar. Fortunately experience has taught that if the case is seen early the patient, if not the limb, can in most instances be saved. In the earliest stage, when the typical gas odour appears and a few bubbles can be squeezed from the wound, heroic incisions and the freest possible drainage, followed by constant lavage with sodium hypochlorite, will usually succeed; but if the case has come under observation when gas has begun to spread into the intramuscular planes beyond the site of injury and the limb has begun to swell, amputation is imperative. Any attempt to perform a complete amputation (that is, with flaps to cover the bone) must be made through uninfected tissues, which would not be possible in most instances, as the majority of these are thigh cases. Even when the conditions may appear favourable for a primary flap amputation clear of existing infection nothing will be gained by this procedure in the great majority of cases, for the following reasons.

Disadvantages of Flap Amputation.

1. There will be less chance of ultimately saving the patient's life because there will be less chance of checking the infection.
2. There will be more chance of the patient losing his life at the time from shock.
3. For the amputation to succeed it will have to be performed as high or higher in the limb than the second stage of a primary flush amputation.
4. Healing by first intention cannot be expected. (The cases must be seen on the spot to appreciate this.)
5. The risk of secondary haemorrhage (a very grave danger in these cases) is greatly increased. Since the

* Intravenous ether anaesthesia i invaluable in these cases.

routine adoption of the flush method we have had the good fortune to lose no case from secondary haemorrhage following amputation in this hospital. The only death in this hospital from secondary haemorrhage after amputation, during the last six months, occurred in a case operated on near the front by the flap method. Secondary haemorrhage occurred during transit and again after admission to this hospital.

6. The need for re-amputation for sepsis or haemorrhage may be expected at a time when the patient is unable to stand further operation, and often when there is *no more limb available* for an amputation.

Advantages of Flush Amputation.

The advantages of the flush method are:

1. Rapidity with minimum shock.

2. A plain open surface for dressing, which is favourable to the subsequent control of sepsis and which prevents pocketing.

3. Great diminution in the risk of secondary haemorrhage.

4. The operation provides the best mechanical relief of gas tension by dividing all the tissues at right angles to the muscle planes.

5. It allows a *temporary amputation to be performed close to the site of injury*, so that a permanent amputation can be performed later (when sepsis is under control) *a little above the injured area.*

6. In cases associated with fracture the proximal end of the bone can be, and should be, left intact (that is, not sawn through) and projecting beyond the plane of muscle section, thus minimizing the risks of osteomyelitis and also providing a useful medium (*a*) for the application of pressure by means of dressing in case of haemorrhage (a practical point of great value), (*b*) for moving and fixing the limb, (*c*) for the application of extension to the skin.

The flush circular method may be modified, according to circumstances, by a single skin flap cut from the damaged area and turned back, thus saving a few inches of bone in the final result, although this flap is liable to slough owing to anaërobic or streptococcal infection.

Amputations for Conditions other than Gas Gangrene.

In my experience amputations are seldom called for at the base hospitals for other conditions. Cases of fractured femur, unless they develop gas infection or severe streptococcal infection, are so well and so thoroughly treated that most of the limbs are saved. Useless mangled limbs, even though not "gas infected," are best treated by the flush method in the first instance, because by this method (owing to the nature of the sepsis) more limb is saved in the end. A few cases of dry gangrene are met with in which an orthodox amputation can be performed at the seat of election.

In field ambulances or casualty clearing stations conditions are somewhat different, and it may be, and often is, practicable to perform amputations with flaps for severely damaged limbs before the onset of sepsis, just as in civil practice. Even under these more favourable conditions the result may be vitiated by a hurried evacuation (as occurred in the case mentioned above). These remarks refer in the main to the lower extremity. Gas infection in the arm is not only less common but also less serious.

After-Treatment of Flush Amputation.

After-treatment of the flush amputation seems to give rise to trouble at home. In many instances at this hospital the amputations have been completed by a secondary operation, and in every case with satisfactory results. Unfortunately, we have been compelled to send most of the cases home after the primary amputation.

The secondary amputation should be done as soon as sepsis is under control and the general condition of the patient is favourable to further amputation, and before extensive cicatrization has occurred.

The details of the secondary amputation are important. If flaps are cut and muscle planes opened up, a "flare up" may be expected, but if the muscle attached to the bone is carefully separated from the periosteum by snipping with scissors until the amount of bone required to be removed has been bared, and if the bone is divided without lacerating the granulation tissue, the operation can be done without any local or general reaction. Before dividing the bone, the handle of a Lane's bone elevator should be passed over the bone and the blade held upwards by an assistant. This serves to protect the soft parts from the saw and to steady the limb. The flexible metal of the fracture box can be used to serve the same purpose. The skin can be brought together without undercutting and need not necessarily be sutured at the time, although sutures should be inserted for tying later. Deep mattress sutures should be used and rubber tubing inserted beneath the loop and knot of the stitch to avoid sloughing of the skin from pressure. This stage is greatly facilitated if a single flap has been cut and turned back in the first instance. The periosteum should not be stripped back from the bone, otherwise new bone is thrown out in the muscles. During the interval between the first and second operation the skin should be kept stretched by means of an extension attached either to a weight and pulley or to the bone stump, if long enough, or to a Thomas's knee-splint. A big metal ring (18 in. diameter) may be used for the stirrup to facilitate dressing.

When the bone is left long and projecting beyond the divided muscles, troubles in the form of necrosis and intramuscular callus should not arise, troubles which have formed the basis of some complaints in the past. Some critics seem to imagine that the operation is performed (when the bone is cut short) as a permanent procedure, and that healing by granulation is to be awaited. This involves a very prolonged convalescence, and in all probability a painful stump with indifferent skin prone to ulceration. The second operation can and should be performed before any serious cicatricial contraction has occurred. In several instances this has been done here under gas and oxygen, and a completely healed and comfortable stump has been secured within a month of the original amputation.

Consultants to Consult.

A well-known surgeon, who has retired from practice, writing in the *Lancet* (August 7th, 1915) to criticize this operation, says: "It must be remembered that our younger surgeons at the front have not experience to guide them; they are largely guided by what they have read." Every surgical base has the advantage of the advice of a consulting surgeon (contemporaries, more or less, of our critic). Practically all the surgery is done by surgeons who in civil life are on the staff of one or other of the London or provincial hospitals. These surgeons are, in fact, not guided by what they have read, but by what they have seen out here, and should be far better judges (aided by the consultants) of the fitness of any procedure than those who base their opinions of conditions in France on what they read or even on what they see at home when the danger of death has been surmounted by the procedures they call in question.

THE AFTER-TREATMENT OF AMPUTATION STUMPS.

BY C. W. G. BRYAN, F.R.C.S., TEMP. CAPTAIN R.A.M.C.,
BRITISH EXPEDITIONARY FORCE.
[SURGICAL REGISTRAR, ST. MARY'S HOSPITAL, LONDON.]

IN amputations performed for septic gunshot wounds it is usually necessary to leave the wound unsutured, and often a rapid operation has to be carried out with flaps insufficient to cover the end of the bone, which must be excised at a later date.

At the exhibition of fracture apparatus at the Royal Society of Medicine in October, 1915,[1] Sir George Makins showed a short Thomas's knee-splint for exerting traction on the soft parts of an amputation stump. I have been using recently a simple and easily-made arrangement which has the advantage of permitting the wound to be dressed without relaxation of the pull on the soft parts, a continual powerful extension of skin and muscles being kept up.

A ring of aluminium, having a diameter of eighteen inches, is made from a length of the splinting supplied in the regulation field fracture box. All round the amputation stump, from the joint above to about an inch from the edges of the wound, longitudinal strips of two-inch

adhesive strapping are applied; these strips are prolonged about twelve inches beyond the end of the stump and attached to the aluminium ring. The ring is then suspended by three pieces of cord, tied to it equidistant from one another, the cords passing through pulleys hooked to a

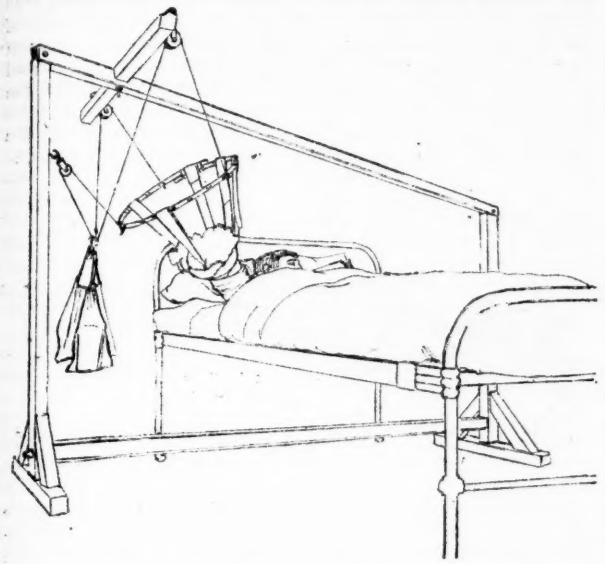

FIG. 1.—The extension apparatus applied to a stump after amputation through the upper third of the arm.

Balkan splint, to which an extra bar of wood has been bolted (Figs. 1 and 2).

The free ends of the cords are tied together and one or more weights are hooked on, at or near the point of junction, so adjusted that the tension on the three cords is approximately equal. For a thigh amputation a weight of about 8 lb. is used, and for the arm about 5 lb. suffices. For an amputation stump of the lower extremity, the foot of the bed is raised on blocks to provide counter-extension.

The wound is accessible for dressing through the open ring, the pull on the soft parts being kept up uninterruptedly.

The method is used as soon as the acute inflammation of the wound has subsided. If long flaps have been fashioned, they are pulled down by the appliance and their edges approximated. If it has not been possible to form

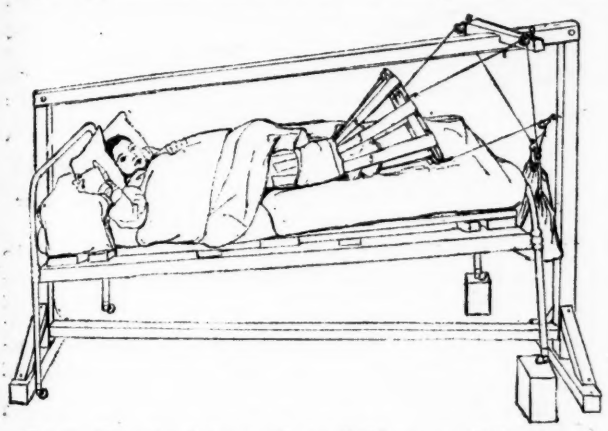

FIG. 2.—The extension apparatus applied to an amputation stump of the thigh.

long flaps the bone may not be covered, but the soft parts are kept from retraction until such time as a secondary removal of bone can be carried out.

When the wound is granulating and sufficiently healthy to permit of partial closure, the soft parts are dissected up from the bone, and the necessary amount of the latter is removed; in some cases the skin edges can be approximated by a few mattress sutures, free drainage being provided. The extension is then reapplied and kept up until the wound is completely healed.

If at the first operation it is possible to suture the amputation wound, it is advantageous to take the tension off the flaps in the way here described, and for the same purpose it may be of use for amputations in civil practice.

The appliance allows the patient free movement and encourages mobility of the joint above; if necessary, the position of the Balkan splint is moved from day to day for this purpose.

I have used the aluminium ring attached to a Thomas's splint, but the method of extension by weight and pulley gives more powerful and continuous traction than a fixed extension, it allows more movement in the joint above, it adjusts itself to the patient's movements in bed, and he is more comfortable and more easily nursed.

I wish to express my thanks to Lieutenant-Colonel T. McDermott, R.A.M.C., for permission to publish this note, and to Lieutenant C. H. Hopwood, R.A.M.C., for the photographs with which my description is illustrated.

REFERENCE.

[1] BRITISH MEDICAL JOURNAL, October 16th, 1915, p. 574.

A METHOD OF TREATING GUNSHOT FRACTURES BY AN EXTERNAL FIXATION APPARATUS.

BY

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GRAYLINGWELL WAR HOSPITAL, CHICHESTER.

THE difficulty of maintaining the bones in good position in some cases of gunshot wound, in which large septic wounds were present, led me to devise this method.

My plan is by means of an aseptic operation to insert into the bone, at a distance from the seat of fracture, screws which are long enough to project well beyond the surface of the skin, and to immobilize the fragments by means of a rigid plate fixed to the screws by nuts, the whole operation being done without interfering with the original wound.

Since I have devised this operation I find that other methods of fixation by means of an external apparatus have been used, but can find no record of such an apparatus being used for the treatment of compound fractures. Parkhill, by means of an open operation, exposed the fractured ends of the bone, placed them in correct position, inserted long screws and fixed them in position by an apparatus external to the skin, afterwards closing the wound. Lambotte has described an apparatus for the treatment of simple fractures by means of a rigid bar external to the skin attached to four long screws inserted into the bone. In this case also the bones are placed in position by means of an open operation, and I can find no statement that he has used it in septic compound fractures. Further, the apparatus also is complicated and expensive.

Experience in all recent wars up to the present has taught that in cases of septic compound fractures the wound should in no case be explored, on account of the risk of the serious spread of infection. But in the present war some surgeons have plated these fractures, leaving the wounds freely open, with excellent results. This operation, I believe, however, is not recommended by the majority of surgeons, the results in many cases being unsatisfactory.

The apparatus which I have been using is shown in Fig. 1. It consists of a plate of the form indicated made

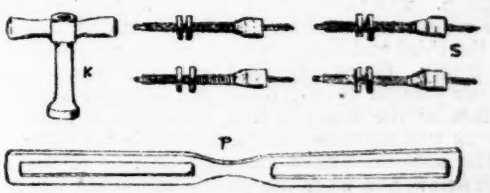

FIG. 1.—The apparatus used in the operation.

of sheet brass ⅛ in. thick and plated with tin, four screws long enough when fixed in the bone to extend about 1½ to 2 in. beyond the skin, and a pair of nuts for each screw by means of which the plate is fixed in position. The screws I have been using consist of a wood screw thread for screwing into the bone, attached by means of a collar to

a $\frac{1}{10}$ in. steel rod in which is cut a thread for the nuts. The collar by means of which the two are joined forms a shoulder up to which the wood thread is screwed home into the bone. The distal end of the screw has a square section, to which a clock key is fitted for screwing it into the bone.

The operation is performed as follows:

The arm is shaved and the skin cleaned as far as possible the day before the operation, and the parts above and below the wound are covered with a sterile dressing and a mackintosh, to prevent as far as possible any soiling by the discharge from the wound. When the patient is under the anaesthetic the wound is covered with dressings

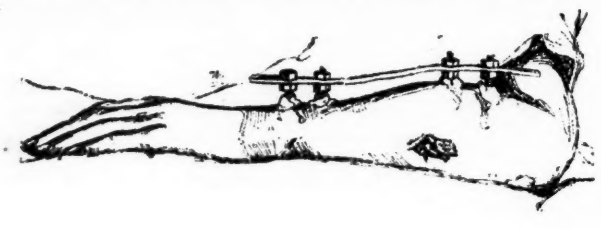

FIG. 2.—Arm after operation.

and a sterile bandage, the whole of which is painted with tincture of iodine. The bandages above and below the wound are then removed, the skin is well cleaned with petrol or acetone, and when quite dry is painted with iodine.

The limb is then manipulated to bring the fragments into as perfect position as possible. In the case of the humerus and radius the posterior surface of the bone is selected for operation; in the case of the tibia the subcutaneous surface.

The point for insertion of the first screw is the highest point of the shaft of the bone, paying due regard to important structures, such as the circumflex nerve. A longitudinal incision, $\frac{1}{2}$ in. long, is made over the centre of the surface of the bone at the point selected. With a blunt dissector a passage is cleared down to the bone, the compact layer of which is then drilled with a hand drill. The point of the screw is made to enter the hole, and by means of the clock key is screwed home. It is very important that no pressure whatever shall be used

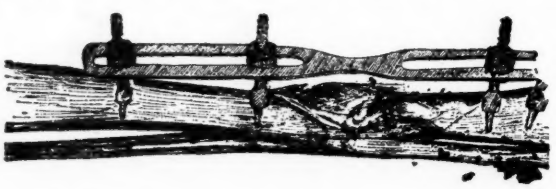

FIG. 4.—Fractured tibia. Lateral view immediately after operation.

when the screw has once commenced to bite, the clock key merely being held between the finger and thumb so that the screw cuts its own way into the bone. In a similar way the second screw is inserted in the lower end of the shaft. These two screws can now be used if necessary in order to manœuvre the fragments into more perfect position. The plate is then placed in position over these two screws and used as a guide in making the incisions for the third and fourth screws, which are inserted in the same way. Great care must be exercised in inserting the screws parallel to each other and at right angles to the surface of the bone; if this is not done accurately the screws will not pass through the slot in the plate.

The nuts are placed one on each side of the plate on each screw, and when the plate is in position are tightened with a spanner. The wounds through which the screws pass are then dressed with small pieces of gauze soaked in collodion or Whitehead's varnish.

The plate can be bent slightly to counteract any slight error in the position of the screws, but only in the first case I treated in this way was any bending necessary.

The plate used for the radius is made slightly curved to follow the curve of the bone; for other bones it is straight.

In cases of fracture of both bones of the forearm it is only necessary to correct the displacement of the radius, as when this is brought into correct position the ulna always corrects itself. I first noticed this fact by examining skiagrams of several dozens of cases of badly comminuted fractures of the shaft of the ulna in which the radius was intact. In no case was there any linear displacement of the fragments whatever. The only exception I have seen was a case in which the interosseous membrane and muscles were badly lacerated, the upper fragment of the ulna projecting through the wound.

The converse does not hold true on account of the attachment of the pronators and supinators to the radius.

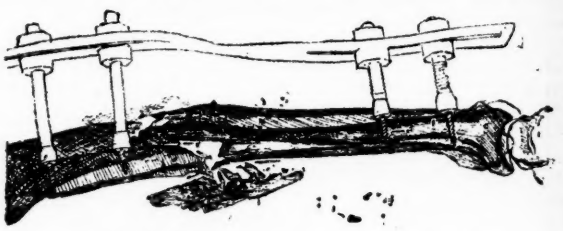

FIG. 3.—The same case. Lateral view of forearm after operation. The screws were left in for nine weeks, during which time there was no rise of temperature, and no suppuration in any of the screw holes.

In the majority of the cases treated in this way there was no rise of temperature whatever following the operation. In one case of gunshot wound of the forearm, with comminuted fractures of the middle of the shafts of the radius and ulna and large septic entrance and exit wounds, the plate was left in position for nine weeks; when the screws were removed there was no sign of suppuration in any of the screw holes. In some other cases there has been some superficial suppuration in some of the screw holes, which did not, however, necessitate removal of the screws till firm union was obtained.

The great advantages of this method are: First, that the apparatus is simple and inexpensive; those I have used have been made on the premises by the engineer at Graylingwell War Hospital, Chichester, at the cost of a few shillings. Secondly, that the operation is simple and rapidly performed, the original wound is not interfered with, and healthy tissues are not extensively opened.

I have not tried this method in cases of fracture of the femur, as most of our cases have been four or five weeks

FIG. 5.—Fractured tibia. The same case, four weeks after removal of screws. Lateral view.

old when admitted. The apparatus, however, would be suitable for cases sufficiently recent to enable one to get the fragments into position by extension on the operating table. For this purpose I have had screws made sufficiently long to pass right through the femur, thus penetrating both compact layers of the bone, and so giving much greater strength to the apparatus.

With suitably shaped plates I intend to try it in cases of fractured jaw, clavicle, and other bones.

Owing to the difficulty of joining a wood screw to one with a thread for nuts the collar is somewhat clumsy, and I am now having screws made in one piece, the thread for screwing into the bone being cut with an ordinary die and at the end being ground to a point in such a way that it forms a tap to cut its way into the bone.

P.S.—Messrs. Down Bros. are now making these plates of steel in four sizes for radius, tibia, humerus and femur, and screws for these made in one piece.

THE late Surgeon-Major Frederic Carter, of Ongar, Essex, who served in the Mutiny, left estate valued at £34,343.

A NOTE ON DYSENTERIC ARTHRITIS.

BY

T. GILLMAN MOORHEAD, CAPTAIN (TEMP.) R.A.M.C.

JUDGING from the scanty literature at my disposal, the occurrence of arthritis, single or multiple, as a complication or sequel of amoebic dysentery has received very little attention, though some writers, such as Phillips, briefly refer to it, and Manson states that a condition resembling gonorrhoeal rheumatism has frequently been noted as a sequel, and that at least one epidemic has been recorded in which a large proportion of the cases became affected in this way. Osler also briefly refers to the possibility of its occurrence.

As, however, its practical importance seems to have been overlooked, I write this note with the object of pointing out that in all cases of arthritis occurring in our troops a history of dysentery should be inquired for, and, if such a history is obtained, a course of emetine should at once be ordered. In my experience of six recent cases emetine clears up the arthritis most rapidly after other treatment has failed.

In four out of the six cases there was definite proof that amoebic dysentery had been present, either by the finding of amoebae in the stools at the time the arthritis was present, or owing to the fact that the patient had been previously treated in this hospital for amoebic dysentery, and that amoebae had been found at the time of this treatment.

In two cases the history of dysentery while at the peninsula was quite definite, but I had no means of determining whether the dysentery had been of the amoebic or bacillary variety. One of these cases—a bad one—was given both serum and emetine; the other was treated by emetine alone, and both rapidly recovered.

The case that first called my attention to the subject was that of a man who was admitted on December 4th, 1915, suffering from well-marked amoebic dysentery, confirmed by examination of the motions. He was given a course of 5 grains of emetine, and rapidly improved as far as the dysentery was concerned, but remained weak and very much pulled down.

On December 29th, 1915, our bacteriologist (Lieutenant Willmore) reported the stools as containing no amoebae.

On January 7th, 1916, he complained of severe pain in the right knee, and on the next day the joint was found to be much swollen, due to the presence of fluid and general thickening of the periarticular tissues. The condition, in fact, as Manson states, exactly resembled that of gonorrhoeal rheumatism. The patient was put on large doses of sodium salicylate and alkalis, but on January 9th the right knee was worse, the left knee was also involved, and the right elbow and both wrist-joints were also painful and swollen. By January 14th there was no improvement; the patient could not move in bed owing to the pain, and the slightest attempted movement of any of the affected joints caused acute agony. On this date it was decided to stop the salicylates, and to start a course of emetine injections.

By January 18th the wrist and elbow had practically completely cleared up, and the knees, while still swollen, were enormously improved, and could be moved freely without pain. A week later there was still further improvement, and in the first week of February the patient was able to get out of bed for a short time daily.

The other cases resembled this as far as the appearance of the affected joints were concerned, except that in none of the others were the joints of the arms involved, the knees being the joints to suffer most, as they were affected in all of the cases, while in two the ankles also, and in one the right hip-joint, were involved.

The complete proof that these cases of arthritis were amoebic in origin is wanting, as I did not feel justified in aspirating the joints, but if we may rely on the therapeutic test of rapid recovery under the use of emetine, there is little doubt as to the nature of the condition.

It is possible that the severe strain put on the joints by the life of a soldier renders them unusually liable to suffer, and if there should be any extensive appearance of the condition it is important that medical officers should be on the look-out for it, and should at any rate give anti-dysenteric treatment a trial.

THE King has granted Dr. Gordon O'Neill, Professor of Obstetrics in the Peiyang Medical Council, Tientsin, permission to wear the Seventh Class of the Order of the Excellent Crop, conferred upon him by the President of the Chinese Republic.

PRELIMINARY NOTE ON A DISEASE CALLED "BUNGPAGGA,"

FOUND IN THE NORTHERN TERRITORIES OF THE GOLD COAST.

BY C. R. PATTON, M.B., CH.B.,

MEDICAL OFFICER WEST AFRICAN MEDICAL SERVICE.

THIS curious disease has been known to the natives of West Africa for some time, as the Chief of Tansia told me that he had had it at the time when the slave raider Samori overran the Northern Territories about twenty years ago. It goes by many names, according to the severity of the outbreak, to the locality and tribe in which it manifests itself. The various natives of the Gold Coast, the Northern Territories, the Nigerias, and the Senegal are said to recognize it readily, and it is probably even more widely spread, but information on the subject is scanty. In the Wa district, at any rate, certain low-lying villages in the swamps seem to be more adapted to the incidence and spread of "bungpagga" than others.

Names.

The multiplicity of names will probably give one an idea of its prevalence; thus, in the following languages its synonyms are:

Hausa: *Chewan daji* (?). In Robinson's Hausa dictionary is mentioned "a fever which breaks out when the guinea-corn is ripe (*Chievo na sabon dawa*). To prevent being attacked by it the Hausas give presents of dawa to the poor."
Dagarti: *Bunyura, Bunyuri, Bungura.*
Walla: *Bunggura.*
Lobi: *Bungpagga, Bungpwagga, Bungpwakka, Bungworra.*

Season.

It occurs both sporadically and epidemically at the time when the guinea-corn and rice (hakki) are ripe and ready for harvesting—that is to say, just after the rainy season in the Northern Territories.

Sex and Age.

It attacks both sexes, and it occurs at all ages in those who are able to eat grain. Adults appear to be more prone to it than children.

Etiology.

The natives regard it as infectious. Some ascribe it to the sun's activity at this time of the year. It appears to me to be due to a micro-organismal infection which produces a neuro-toxic effect as well as a local reaction. In every one of the pus slides I examined I found a heavy infection of saccharomyces. Every precaution was taken to prevent contamination, and yet the fields showed yeast cells in all stages of gemmation. The slides were made, fixed, and stained as soon as the pus was taken from the abscess. The cultures showed a true fungus growth. No experiments were tried owing to lack of material. Personally, I am inclined to think that the disease is caused and perpetuated by a yeast fungus; the yeast spores probably remain in the mud bins in which the grain is stored awaiting a favourable opportunity to grow, they get their chance after the rains, when the interior of the bins becomes a hot moist chamber. The grain becomes infected in the bin, the people eat the grain raw, and being usually constipated, their intestines are secondary incubators. The yeast cells are probably absorbed from the intestine somewhat in the same way as fat is by migratory leucocytes, and thence into the general circulation.

Incubation Period.

The definite incubation period appears to be three days, during which there is malaise, headache, a sense of fatigue, anorexia, intense thirst, and constipation.

Symptoms.

The onset is sudden; one or more rigors may usher in the attack. The temperature rises rapidly to 103° or so. There is extreme tenderness in the muscles which are to be the seats of inflammation. Within twelve hours painful tumours make their appearance in the affected muscles; only the voluntary muscles are affected, and the abscesses seem always to occur near their insertions. There may be only one nodule, or a crop. In some

cases the distribution is bilaterally symmetrical. The tumours are deep-seated; they are hard, non-fluctuating, very painful, with their long axes either in or parallel to the long axes of the muscles affected. They do not correspond to lymphatic glands. Each tumour is about the size of an English hen's egg. They are at first hard and firm, and are easily visible and palpable; later on, if the patient survives, they become slightly soft, but never flabby. Usually, in mild cases, the abscesses point after some weeks, and burst if unopened. As a rule, the fewer the nodules the better the prognosis.

The natives often incise the nodules to relieve the symptoms; if white fluid exudes, the case is labelled fatal; if the fluid is yellow, the patient will recover. Sometimes there is no fluid, and then the Ju-ju man gives the patient a delphic reply. Some of the natives carry the scars of former "bungpagga" abscesses.

The patient is alert and sleepless on account of the great pain in the affected muscles. Sedatives have to be used in large doses before any relief is obtained; salicylates are of no avail.

If the patient survives the acute stage he stands a good chance of recovery. The deaths usually occur within the first week, the third and sixth days seeming to be the most critical. Even during convalescence (for two months or more) the patient exhibits an occasional febrile reaction

Mortality.

"When it is called Bungpagga it is very fatal, nearly all die; but when we call it Bungyura most of the people recover." This is the typically oracular answer one gets from the natives. Some of the people consider the disease to be as fatal as sleeping sickness.

General Remarks.

From the investigations of Drs. Corson, Ryan, and myself we are inclined to believe that this is a special disease. The Hausas say that they have seen it occur among the other tribes, but not among themselves. Perhaps they wish strangers to be impressed with the efficacy of the dawa offerings. One could not discover whether the fortunate poor contracted the disease after eating these oblations.

The natives also readily recognize such infections as actinomycosis, anthrax, bubonic plague, guinea-worm, and malaria, syphilis, etc. Their knowledge of disease seems to be exact, but they are so superstitious and suspicious that they make one wade through a quagmire of falsehood and general information to get to the tiny islets of truth bearing on one's quest.

An epidemic of this disease broke out recently among the labourers employed on the Yeji-Mcongo road. The officer in charge of the construction work said that by far the largest number of fatalities were due to this disease. He had made arrangements for the provisioning of his workmen; large quantities of maize, millet, guinea-corn, etc., were bought and stored in mud huts so as to meet requirements. Some of this grain may have been infected, and may have given rise to this outbreak. Preventive measures should be adopted in good time so as to prevent an outbreak among troops who live on such food. Millet is often eaten in the raw state. Our men should be warned of their danger and should be ordered to cook their grain.

Investigations into the cause and spread of this disease are being taken in hand in West Africa, but it would help matters considerably if all cases of this disease were reported on.

AN interesting experiment in school hygiene at Winchester, Massachusetts, is described in the *Boston Medical and Surgical Journal*. Two seventh-grade classes, consisting of children of the same kind, were compared after one class had been for four months taught in a room so altered that a full supply of fresh air could be admitted. The temperature was kept at about 45° F., and the children were clothed in blanket coats and bloomers, with lined canvas boots. At the end of the period the children were compared with those of another seventh-grade class in the same building who worked in an ordinary room. It was found that whereas the average gain in weight of the open-air class was 3.61, that of the other class was 1.69. In height the open-air class gained 0.49, the other 0.24. In the haemoglobin test the open-air class gained 4.55, while the other lost 3.07 per cent.

AN OBSERVATION IN PERNICIOUS ANAEMIA.

BY

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SOME years ago, after careful examination of the literature, I published a paper* embodying an original idea, and ventured to express the view that, although original, I doubted whether it was novel. A few weeks later, whilst buried in journals in search of data on quite a different subject, I found that my idea had been anticipated some years previously, and on looking up that paper I found yet an earlier reference to a journal published in 1886 embodying the treatment suggested.

The vastness of the literature must be my excuse for absence of any references to experiments of a similar nature to the one I am about to describe.

In March, 1915, I had under my care a very severe case of pernicious anaemia, also one of well-marked erythraemia (polycythaemia).

The consensus of opinion as to the process leading to anaemia in pernicious anaemia is that an excessive destruction of red cells is occurring. The cause of this destruction has been a subject of considerable work, more speculation, and no satisfaction. It would ill become me to add to the speculation.

Erythraemia must be due to one or a combination of the following: abnormally rapid development of red cells, an abnormally slow destruction of red cells, an insufficient quantity of plasma.

On an attempt to determine which of these takes the most prominent part, I am engaged at present.

It seemed to me that it would be of interest to note what would happen if I were to transfer some quantity of blood from the patient suffering from erythraemia to the patient who had pernicious anaemia, and at the same time inject into the erythraemic patient some blood from the case of pernicious anaemia.

Courtesy to my colleague, Dr. F. J. Smith, makes me digress for a moment: the case of pernicious anaemia under my care wished to return home, and therefore left the hospital, and I am indebted to Dr. F. J. Smith for transferring to me one of his patients.

The patients had the circumstances explained to them in detail; that there were certain risks, and that as far as I knew, no similar observation had been recorded. The two men said that they were quite willing to undergo any treatment which might in any way benefit them, and that they did not mind any risk, because for several years their lives had been spent in hospitals and were of no advantage to them or any one else.

Details of the method of transferring the blood are unnecessary. All that is essential is to state that the apparatus was washed out with sterile olive oil and drained, so that there should be no excess, and that coagulation was prevented by the addition of a minute quantity of sodium citrate. Every precaution was taken to prevent any air being injected, and a window quite close to the point of injection allowed me to be certain that not a bubble entered.

After a small quantity—that is to say, 2 oz.—of blood had been injected into the man suffering from pernicious anaemia, he went paler; he complained of nausea and faintness, and the injection was immediately stopped. He then became slightly flushed in the face, and made grimaces as if he were undergoing pain. On being asked, he stated that he had pain all over him, something like cramp, quite severe; this lasted for a minute, and then disappeared, and he was soon quite comfortable.

I was very disappointed that only so small a quantity of blood had been introduced, but nevertheless thought that if the blood contained some material which stimulated production of red cells this might lead to improvement in the condition of the patient. Examination of the blood a week later showed that the red cells had risen from 600,000 to 1,050,000, and the haemoglobin percentage from 10 to 20.

As the result was so promising it made me almost regret that it was not my custom to publish any observation on treatment within a year of having made it; this resolution

* A Contribution to the Treatment of Chronic Empyema. BRITISH MEDICAL JOURNAL, April 15th, 1905.

had been brought about by a statement of a former teacher, whom I hold in the greatest respect, who had once (probably humorously, although truthfully) made the remark that journals took so long to publish papers that he had often altered his view before his theories appeared in print.

The result was sufficiently satisfactory to make the patient anxious to have further treatment, and five weeks later I again transferred blood, and on this occasion some 8 oz. of blood. The symptoms produced were similar to those produced on the former occasion, but much more severe. The patient vomited for close upon half an hour, and for a time gave rise to some anxiety due to the strain thrown upon his heart. The after-effects were not satisfactory, neither the number of red cells nor the quantity of haemoglobin being increased to any large extent.

Therefore, in this case, at any rate, transference of blood proved to be useless. The patient left the London Hospital in March, 1916, in a condition very similar to that in which he entered it in March, 1915. I record the observation in order that other observers to whom a similar idea may occur should realize that there is a certain risk in transferring large quantities, and that it is quite probable no benefit will result.

Reports
ON
MEDICAL AND SURGICAL PRACTICE IN HOSPITALS AND ASYLUMS.

THE ISOLATION HOSPITAL, SOUTHAMPTON.

AN ANOMALOUS CASE OF ENTERIC FEVER.

(Reported by OSCAR HOLDEN, M.D., D.P.H., Resident Medical Officer.)

T. F., a gardener aged 25, was admitted on August 1st, 1915. He had been out of sorts for about fourteen days, but remained up and about. Walked a considerable distance on July 29th, and got up to breakfast on July 31st, but went to bed at mid-day, and was delirious the same evening. He had consulted his private doctor on July 30th because of diarrhoea. He had not been inoculated against typhoid fever.

On admission he was seriously ill. There were sordes around the teeth and lips, the tongue was dry and foul, but there were no spots or rash. The abdomen was tympanitic, rigid, and diffusely tender; on palpation it moved fairly well on respiration. The spleen was not palpable; the liver was felt just below the chest margin. There was no cough or other lung signs, but a most persistent hiccough. The heart sounds were regular and strong, with a very faint rub at the apex.

The chief points in the further progress of the case were: Violent hiccough until the end; practically complete suppression of urine for forty hours after admission, and then a copious flow with incontinence; obstinate constipation for fifty-two hours after admission, and then large, frequent, and offensive stools, also incontinent. The abdomen, at first distended, became flat, but the tenderness persisted. Unconsciousness, becoming more profound, ensued, with increasing restlessness until death.

At no time was his temperature above 97° F. Widal reactions were inconclusive. Lumbar puncture, thirty-six hours before death, afforded no evidences of intraspinal mischief. The urine contained abundant albumin and a few granular casts. Death appeared to be due to a profound intoxication.

Post-mortem Examination.

August 7th, 2.30 p.m. Well-developed man. *Post-mortem* staining marked.

Abdomen: The omentum was spread out over the small gut and was injected. No free peritoneal fluid and no adhesions. Stomach, duodenum, and jejunum normal, except for slight injection, probably due to turpentine given therapeutically. The ileum showed no enlargement of solitary follicles or Peyer's patches, except in the last foot. Here in the upper half the patches and follicles were reddened and swollen, but not ulcerated. In the 5 in. above the ileo-caecal valve were masses of small ulcers, with some larger ones. So numerous were the ulcers that the gut wall presented a ragged, rat-eaten appearance. The ileal side of the valve was partially sloughed away. The appearance of the ulcers hardly warranted the assumption that they were typhoidal, but bacteriologically they proved to be such. The appendix and large gut were normal. The spleen was hard, not enlarged, and rather anaemic. The liver, normal. The kidneys showed parenchymatous nephritis, more severe in the right organ. *Heart:* A patch of recent fibrinous pericarditis showed over the apex. There was no valvular disease. Atheromatous patches were scattered over the ascending aorta. The brain and meninges were normal.

Comments.

It seemed that the patient had been up and about during an attack of enteric fever, ending fatally six days after taking to bed.

The complete constipation may be accounted for by blockage at the ileo-colic valve during separation of the sloughs; the subsequent diarrhoea to imperfect closure after sloughing. The suppression of urine may have been caused by the onset of a specific parenchymatous nephritis.

The continual subnormal temperature is difficult to account for in view of the extensive ulceration and sloughing of the lower end of the ileum. The spleen was of a non-febrile type. Possibly the intoxication was so great that there was a depression of the cerebral nerve centres, but the heart rhythm was unaffected and the strength unimpaired until a few hours before death. The action of the toxin was similar to that seen in some suddenly fatal cases of diphtheria.

I have to thank Dr. Lauder, M.O.H. Southampton, for permission to record this case.

Reports of Societies.

VISUAL DISTURBANCES FROM CEREBRAL LESIONS.

AT a meeting of the Ophthalmological Section of the Royal Society of Medicine on March 22nd, Colonel LISTER, A.M.S., C.M.G., and Lieutenant-Colonel GORDON HOLMES, M.D., R.A.M.C., read a paper on disturbances of vision from cerebral lesions, with special reference to the cortical representation of the macula. The authors stated that in their work at the base hospitals in France during the past eighteen months they had observed a large number of cases in which the vision was affected by lesions of various portions of the optic system, and a certain number of suitable cases had been selected bearing on the cerebral localization of vision, more particularly on the representation of different regions of the retina in the cortex. As the observations were necessarily made at an early stage after the infliction of the injury, some of the effects observed may have been due to functional disturbances, rather than to local injuries of the corresponding cortical areas or their centripetal fibres; but if it could be shown that there was a constant relation between the probable site of the injury and the form of the visual defect, certain general conclusions would be justifiable. The injuries in the cases referred to included penetrating and perforating wounds of the cranium by rifle bullets, shell fragments, and shrapnel, as well as local concussion and depressed fractures.

Superior quadrantic hemianopia was strikingly rare in gunshot wounds of the occipital region. The fact that in over 2,000 cases of head injury a central scotoma was never seen when a direct injury of the occipital poles could be excluded was regarded as striking evidence that central vision was represented on either, or both, the mesial or the lateral surface of the posterior borders of the occipital lobes. The observations conformed to the general view that the visual area corresponds with, or at least includes, the area striata. No conclusive evidence had been obtained that achromatopsia, with intact vision for white, was produced by cerebral lesions which involved either the cortex or the optic radiations.

The authors formulated the following conclusions, which they do not yet regard as final:

1. The upper half of each retina is represented in the dorsal, and the lower in the ventral, part of each visual area.

2. The centre for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and the lateral surfaces of the occipital lobes.

3. That portion of each upper quadrant of the retina in the immediate neighbourhood of, and including, the

adjacent part of the fovea centralis is represented in the upper and posterior part of the visual area in the opposite hemisphere, and vice versa.

4. The centre for vision from the periphery of the retinae is probably situated in the anterior end of the visual area, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual area.

AT a meeting of the Section of Medicine of the Royal Academy of Medicine in Ireland on March 3rd Dr. WALTER SMITH read a paper on *Soya bean (Glycine hispida) and its uses in physiology and medicine.* Attention was drawn to its important dietetic and economic applications, which admitted of considerable extensions, if its cultivation were extended, especially in South Africa. The seeds were free from starch and sugar, and had been utilized in the treatment of diabetes. Takeuchi, a Japanese savant, had discovered that the bean contained a specific ferment, urease, which rapidly converted urea into ammonium carbonate. The relations of ordinary urea to ammonium cyanate and of sulphur urea (thio urea) were discussed, and the mutual reversibility of the process in each case was experimentally shown. The almost immediate influence of urease in converting urea into ammonium carbonate was demonstrated, and it was pointed out that urea had recently been discovered in a number of plants up to as much as 3.5 per cent. in a fungus. A practical point in connexion with urease was its application to the quantitative estimation of urea. The most rapid methods of estimation for routine work were: (*a*) The hypobromite method; (*b*) Folin's process with $MgCl_2$ and HCl; (*c*) the most accurate method was by urease, which was quite applicable to clinical work, and was, in fact, a very simple and easy method. The ammonia was absorbed by decinormal sulphuric acid.

Reviews.

LARYNGOLOGY AND OTOLOGY.

DR. W. H. KELSON'S book, *Diseases of the Throat, Nose, and Ear*,[1] illustrates the extreme difficulty of presenting a useful survey of these large subjects in a small space. He states in the preface that it is "written for general practitioners and senior students, and so full details are given as regards such proceedings as the doctor himself usually undertakes—for example, the removal of cerumen; but to those which he generally passes on to the specialist—for example, the mastoid operation—only brief reference is made." Nevertheless, we think that the student wants to know more about the operation for acute mastoiditis than that it "consists in opening the antrum and removing any diseased bone found, and draining; some operators, however, close the wound." About three-quarters of a page is devoted to the radical mastoid operation, but in neither case is it mentioned that the cavity is packed, and no account is given of the after-treatment, which often falls to the lot of the general practitioner, and which is all-important to the final success of the case. As no details of the operative procedure are given, the six large illustrations of the surgical anatomy of the parts appear superfluous. The style of writing is somewhat loose, and the arrangement of subjects rather haphazard; thus, hay fever, rhinorrhoea, and vascular neuroses are not placed near together, while rhinoscleroma, leprosy, and glanders are separated from syphilis, tubercle, and lupus by many paragraphs. The paragraph headed "Organic affections of the nose" is devoted entirely to perversions of smell, and occupational deafness due to exposure to noise comes under "toxic causes" of internal ear disease. The headings of the chapters and paragraphs are, indeed, so erratic as to cause confusion, and one often finds the account of a disease interrupted by a new heading in capitals, while a new subject is begun without the distinction of a fresh heading. Having made these criticisms, it remains to say that the book shows evidence of a wide knowledge and experience of the subject. Errors are few, though in dealing with the treatment of syphilitic nerve-deafness the remark that "later on injections of pilocarpin may be tried" is an inadequate reference to a method of treatment the value of which lies in its early application. But the teaching is in general sound and practical.

A small manual written for students and practitioners can only achieve success if it offers real help in the recognition and treatment of disease. This, we fear, is just what Professor COOLIDGE'S little book on *Diseases of the Nose and Throat*[2] fails to accomplish. Professor Coolidge writes in a pleasantly facile and discursive style, but his descriptions of pathological processes lack precision and omit details which give a clear clinical picture of disease and assist the practitioner in the understanding and management of the individual case. Thus, the paragraph on tuberculosis of the pharynx does not mention that it is painful, and that it usually occurs in the latest stage of consumption; among the causes of anosmia it is said that "it may be a symptom of some constitutional weakness or nervous instability"; of the diagnosis between nasal and cerebro-spinal rhinorrhoea it is only stated that it is possible by chemical analysis, "but sometimes uncertain on account of the similarity of the fluids." The diagnosis between antral and frontal empyema is hardly discussed and no mention is made of Fraenkel's posture test; while the causes of antral suppuration "may be a foreign body, some suppurating focus, possibly connected with the teeth, discharging into it, or a diseased condition of the antral wall." In the sections on treatment, the doses of drugs are not systematically given; that in the after-treatment of antral operations "if packing remains in the antrum it should be removed as soon as it can be dispensed with" is rather vague; and so is the statement that after the frontal sinus operation the skin wound is "brought together and sutured, except when it is considered safer to keep it open temporarily." Two measurements only are given in the article on bronchoscopy and oesophagoscopy—from the incisor teeth to the bifurcation of the trachea, "about fourteen and one-quarter inches," and to the cardiac orifice, "about fifteen and three-quarter inches"; the latter is unnecessarily particular, seeing that the distance varies by an inch or more in different individuals, and the former is $4\frac{1}{4}$ inches in excess of the measurement usually given. Exception must be taken to the advice to remove nasopharyngeal fibromata with an *écraseur*. The author states that "in some cases most of the growth can be removed in this way," and does not appear to realize the dangers of incomplete removal.

SURGERY.

UNDER the title *Back Injuries and their Significance*[3] Mr. A. MCKENDRICK has written an interesting little book. Its object is to throw some light on the class of cases which bulk so large in courts of law, and is intended to help not only the medical practitioner but the lawyer. As the author points out, it is in the minor rather than in the major injuries that difficulty as to diagnosis and doubt as to treatment chiefly arise. Cases of strained back are fully considered, and interesting suggestions made with regard to electrical testing by means of condenser discharges. Mr. McKendrick is surgeon in charge of the *x*-ray department at the Royal Infirmary, Edinburgh, and hence writes with authority on the subject of radiographic diagnosis. The book throughout is very helpful and shows well how necessary it is to be systematic and accurate in examining and reporting on any case which may eventually find its way into court.

A Manual of Surgical Anatomy,[4] by L. BEESLY and T. B. JOHNSTON, has recently been published. It resembles

[1] *Diseases of the Throat, Nose, and Ear.* By W. H. Kelson, M.D., B.S., F.R.C.S.Eng. London: H. Frowde, and Hodder and Stoughton. 1915. (Demy 8vo, pp. 285; 6 plates, 89 figures. 8s. 6d. net.)

[2] *Diseases of the Nose and Throat.* By A. Coolidge, A.B., M.D Philadephia and London: W. B. Saunders Company. 1915. (Post 8vo, pp. 360; 68 figures. 6s. 6d. net.)

[3] *Back Injuries and their Significance under the Workmen's Compensation and other Acts.* By A. McKendrick, F.R.C.S.E., etc. Edinburgh: E. and S. Livingstone. 1916. (Cr. 8vo, pp. 179; 14 figures. 2s. 6d. net.)

[4] *A Manual of Surgical Anatomy.* By L. Beesly, F.R.C.S.Edin., and T. B. Johnston, M.B., Ch.B. London: H. Frowde, and Hodder and Stoughton. 1916. (Cr. 8vo, pp. 571; 164 figures. 12s. 6d. net.)

in appearance a volume of Cunningham's *Manual of Practical Anatomy*, and the general arrangement of the book closely follows that adopted in that well-known book. Several pictures from it, which have, in the course of time, become firmly fixed in memory, will be recognized. The new figures and diagrams, of which there are many, are drawn by Mr. J. T. Murray, and are excellent. In addition, there are many useful radiograms, illustrating the positions of the epiphyseal lines and other subjects. The book includes in its scope something more than surgical anatomy, for the authors have wisely described many of the operations of surgery from the anatomical point of view, without, however, considering surgical technique. They have adopted the new anatomical nomenclature, but have taken pity on the older of us by adding the old-fashioned names where there is any difficulty. It has sometimes been said that anatomy should be taught by operating surgeons, as they are better able to appreciate what is really essential to the medical student. Without going as far as this, it is certainly true that much anatomy is learnt in a rather unintelligent way, without any heed being paid to its surgical significance. The book shows evidence of a clear grasp of practical points, and there is no doubt that every second-year student would do well to possess it, using it as a companion to his manual of anatomy in the dissecting-room. He would find that its study would greatly lessen his labours at a later date, when watching operations and working in hospital, and eventually when presenting himself for his final examination.

The Clinics of Dr. J. B. Murphy at Mercy Hospital Chicago,[5] published in the form of a sturdy two-hundred-page volume six times a year, is a periodical that has now completed its fourth year of existence. It is composed of *viva voce* accounts of surgical cases, the operations that were done upon them, the results obtained, and any particularly interesting points for discussion that might arise in connexion with them. Dr. Murphy's clinic is famous, and the variety of the cases with which he has to deal is very great; the result is that his bimonthly review is of no little interest to the surgeon. It is inevitably a superficial production, time and opportunity for the profound study of the cases being, apparently, to seek. But it has all the value that attaches to the ephemeral handiwork of an exceptionally gifted operator.

INCOME TAX.

THE assessment of income tax is affected by upwards of fifty different Acts, and *Pratt and Redman's Income Tax Law*[6] constitutes a successful attempt to classify and render intelligible the existing chaotic accumulation of statute law. Generally the condensations avoid the danger of ambiguity, but there are exceptions. For instance, in dealing with the allowances for depreciation, Mr. Redman condenses the phrase "trade, manufacture or concern in the nature of trade," by omitting the qualification of the word "concern," whereas it is on that very qualification that the authorities apparently rely in holding that depreciation is not allowable in the case of assessments on professional men. Deduction for rent in calculating profits is not, as the author suggests, subject to restriction according to the Schedule A. assessment, which is material only where the premises are owned and no rent is actually paid. The payment of life assurance premiums carries with it a right to receive an "allowance," but is not a deduction in the same way as business expenses, and would more properly be dealt with fully in Chapter IX than among the deductions allowable under Schedule D. The case law is admirably selected and introduced by way of footnotes, and the book has been brought thoroughly up to date. It includes the text of the more recent Finance Acts and a chapter on excess profits duty, but fortunately the latter is of little interest to medical practitioners.

[5] *The Clinics of John B. Murphy, M.D., at Mercy Hospital, Chicago.* (Med. 8vo, pp. 798–1265, illustrated. Paper, 35s. net per year; cloth, 50s. net.

[6] *Pratt and Redman's Income Tax Law.* By J. H. Redman, Esq., of the Middle Temple, Barrister-at-Law; with a chapter on *Excess Profits Duty*, by the late J. Tidd Pratt, Esq., Q.C. Ninth edition. London: Butterworth and Co., and Shaw and Sons. 1916. (Post 8vo, pp. 511. 9s. 6d. net.)

ORDEAL BY BATTLE.

WHEN OLIVER'S *Ordeal by Battle*[7] was published, in June, 1915, it was eagerly read by men who had grown weary of party shibboleths, and wanted to think for themselves in a desperate effort to understand how this world catastrophe had come upon us. The book frankly discussed the share of responsibility of all of us in bringing it about; our sins of commission and omission—alike of those who were foolish enough to believe in "wait and see," and those who, though they saw, were weak enough to wait. The author was one of those who sat at the feet of Lord Roberts when he tried to arouse the country to the need of national service. The book, therefore, contains a trenchant criticism of the paralytic policy of the decade before the war, but it does not spare the party which was in opposition throughout the greater part of that period. We cannot do very much more than announce the publication of a cheap edition slightly abridged, congratulate the publishers on having brought it out in a handy form and good print, and express the opinion that every one who desires help in thinking clearly should spare the shilling for its purchase. We may perhaps add this much—a great deal has been written about the stupidity of the Germans in their misunderstanding of the psychology of other people. Mr. Oliver shows very cogently how the Germans may fairly retort that we misunderstood theirs. Not only the rank and file of us, but the leaders. The psychology of Lord Haldane, for instance, will probably be still the subject of speculation in the twenty-first century, possibly by the Gibbon of that day. This cheap edition of *Ordeal by Battle* is abridged, but chiefly by condensation of the discussion of the German aspirations and preparations, the least important part to us at this time, and the author has written an introduction which is an appeal to the country to-day; it concludes with the quotation from one who has lost his life in this war: "Under a hesitating commander one of the greatest dangers lies in the fact that it is always possible to produce sound military reasons for doing nothing"; and Mr. Oliver adds, "This is true not only of operations in the field, but of the political conduct of war."

NOTES ON BOOKS.

THE *Medical Register*[8] for 1916 has been issued. It contains the customary table showing the number of persons whose names were entered in, added to, or removed from the *Medical Register* from 1892 to 1915 inclusive. The average number added by registration for the last twenty-four years was 1,284, and for the last five years 1,265. The average for the five years down to and including 1914 was 1,172. The actual numbers were 1,526 in 1915, 1,433 in 1914, and 1,168 in 1913. The total in 1915 included 181 colonial, and 88 foreign registrations. The total number of names in the *Medical Register* for 1915 is 43,225, as compared with 37,671 in 1914, and 41,940 in 1913. The number of names on the colonial list in 1916 is 692, and on the foreign list 125.

The *Dentists' Register*, 1916, has also been issued. It contains 5,453 names. In 1913 the number was 5,140. Of those now on the register 4,005 are graduates or licentiates in dental surgery, 9 have colonial licences, and 14 are foreign dentists. The number of persons registered on their own declaration as in bona fide practice of dentistry is 1,425, but of these 7 have medical or surgical qualifications.

To those who are interested in the scope and working of the many various scientific and learned societies in Great Britain and Ireland, and some others as well, the *Year Book* compiled from official sources and published by Messrs. Griffin and Co.[9] will be of great service. It is now in its thirty-second annual issue. It contains outlines or details of the work of the various societies, with lists of their officers, accounts of their meetings, and details of their published work that in many cases would escape any but local notice if it were not for the *Year Book*. The

[7] *Ordeal by Battle.* By F. S. Oliver. Abridged edition. London: Macmillan and Co., Limited. 1916. (Cr. 8vo, pp. 402. 1s. net.)

[8] The *Medical Register*, 1916. London: Published for the General Medical Council by Constable and Co., Ltd. 10s. 6d. The *Dentists' Register*, 1916 (same publishers). 3s. 4d.

[9] *The Year Book of the Scientific and Learned Societies of Great Britain and Ireland.* Compiled from official sources. Thirty-second annual issue. London: C. Griffin and Co., Ltd. 1915. (Demy 8vo, pp. 357. 7s. 6d.)

societies concerned are classified in fourteen sections; the section devoted to medicine covers thirty-seven pages. Particulars are given of certain of the Government institutions for purposes of reference.

The fifth German edition of Professor ORTNER'S well known textbook of treatment[10] has been translated by Dr. BARTLETT and edited by Dr. POTTER for the benefit of American medical practitioners. The text is divided into sixteen sections, in which are considered the treatments advisable in the diseases of the various organs and systems of the body. The pathological physiology of the diseases is touched upon in order that the reader may have some scientific basis for the lines of treatment he is advised to adopt. Numerous prescriptions are given, altered so as to conform to the American *Pharmacopoeia*. The German original attaches no little importance to the resources of diet, climate, hydrotherapy, and other methods of treatment. The translators, recognizing the importance of this characteristic, have adapted these references to the needs of practitioners dwelling in America, so far as possible. The translation has been well done. The many pitfalls presented by the spelling of the prescriptions (which are given in Latin) have not all been avoided. The book forms a thoroughly sound and conservative manual of treatment. Its previcus English editions have been well received, and we can commend the new edition.

[10] *Treatment of Internal Diseases for Physicians and Students.* By Professor N. Ortner. Edited, with additions, by N. B. Potter, M.D. Translated by F. H. Bartlett, M.D. Third edition in English; revised and reset from the fifth German edition. Philadelphia and London: J. B. Lippincott Co. 1915. (Med. 8vo, pp. 653. 21s. net.)

MEDICAL AND SURGICAL APPLIANCES.

An Electro-Medical Apparatus.

A NEW apparatus of the "universal" type for electro-medical applications has been introduced by the Medical Supply Association (167–185, Gray's Inn Road, London, W.C.) under the name of the "Galvanoset." Its purpose is to use the electrical supply from the main, no matter at what voltage, or whether continuous or alternating, to provide a current for galvanization, ionization, electrolysis, and the testing of muscular reactions. The current is passed, by way of suitable resistances, into a vessel of water, and by an ingenious arrangement of electrodes the transmission to the patient is regulated by rotating a disc of vulcanite over a graduated celluloid scale so as to furnish any degree of variation from absolute zero up to 500 milliampères. The smoothness of the adjustment, the steadiness of the current, and the fact that there is no danger of the patient getting into direct contact with either the positive or negative side of the supply, are strong points in favour of this apparatus, and an additional recommendation is its surprisingly small size and its portability.

MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE SOCIETY.

THE thirty-third annual general meeting of the society was held at its offices, 300, High Holborn, W.C., on March 28th. Dr. F. J. ALLAN, who presided, in presenting the annual report, said that since the war broke out the experience of all insurance societies had been exceptional. The amount of new business had been less than in previous years, but it was substantial, and in the circumstances, with a net gain at the end of the year of seventy new members, was satisfactory. A considerable proportion of the members had increased their insurance for sickness benefit up to 12 guineas a week. As some had applied for insurance for larger amounts, the committee were recommending a further alteration in the rules to enable this to be done; the society safeguarded itself in granting such insurance by requiring a guarantee that the sum insured for was less than the applicant's income. Nearly £20,000 had been paid during the year to members in sickness and accident benefit, an average of £610 per 100 members; this was the largest sum in the experience of the society, but proportionately to the number of members at risk the amount was less than in 1913, when it was £627 per 100 members. During the year one-fourth of the members had to avail themselves of the society's help, and he considered that if that fact was appreciated by the profession the society would have a much larger membership. Though there were many companies offering insurance for sickness and accident, no other company or society could offer such good terms. From the separate list presented it would be seen that there were 450 members on active service last year; the claims from these were less than 10 per cent.; five members had died from wounds or sickness contracted on service. The decision of the society not to charge extra premiums either for sickness or life assurance had been much appreciated, and had led to a certain amount of new business. New members, however, were not accepted for more than 6 guineas a week insurance. Although the society offered an endowment insurance payable at 65, the absence of an annuity fund had been felt to be a defect, and in order to meet the deficiency the committee had consulted Mr. S. G. Warner, F.I.A., who had drawn up a scheme which was before the meeting. Holders of annuities would be given several options, and in the event of death or surrender before the age of 65, all the premiums paid, except the first, would be returned with simple interest at 3 per cent. per annum. The scheme was based on the most recent life tables, which showed greater longevity than previous tables, yet the improved investment facilities made it possible to carry out on quite safe lines the scheme recommended by the actuary. Unfortunately, members holding annuity policies under the old tables could not transfer to the new proposal. Considerable depression had taken place in the value of high class securities, and if the society had to realize its investments it would suffer a loss, but an insurance office under normal circumstances never had to contemplate the possibility of liquidation; all that really mattered was the safety of its income. The bulk of the securities held by the society were repayable at par, and consequently no loss could accrue, but at the quinquennial valuation the actuary had to value the investments at the price then obtaining. In order to meet any apparent deficiency the committee had considered it desirable to make provision for it by the formation of an investment reserve account, and to set aside some £4,000 for that purpose. It was also proposed to keep the surplus balance of the management fund in hand to meet emergencies that might arise. The Chairman then referred to the death of Mr. Addiscott, who had acted as secretary of the society since 1893, and who on his retirement from that post was appointed actuary in order that the society might have the advantage of his long experience and sound judgement. The society had also to mourn the loss of Dr. G. A. Heron, one of its trustees, who took great interest in its work. The Chairman then formally moved the adoption of the report, which was seconded by Dr. MAJOR GREENWOOD and carried, after Dr. VINRACE had made some observations.

An alteration of Rule IV, to allow a member to insure for more than £12 12s. per week full pay, was carried, as was the alteration necessary to reopen the annuity fund on the lines suggested by the committee.

HEALTH OF MUNITION WORKERS.

THE Health of Munition Workers Committee, appointed by the Ministry of Munitions, under the chairmanship of Sir George Newman, has issued four more memorandums.[1]

Of these, the first in order, on industrial fatigue and its causes, is perhaps the most important, since it deals with general principles. This being the case, we hope to refer to it more fully in a subsequent issue.

The next memorandum, on special industrial diseases, deals with a number of substances now extensively used in the manufacture of high explosives which may produce symptoms not hitherto familiar to the majority of practitioners. Of tri-nitro-toluol (also known as trotyl and T.N.T.), operatives employed in its manufacture and in loading it, either pure or mixed with other substances, into munitions have been found affected with unusual drowsiness, frontal headache, eczema, and loss of appetite. Exceptional cases may occur with sudden collapse after a few hours' work on a hot day, but generally the symptoms are at first slight, and, if exposure ceases, quickly disappear. If, however, the exposure be continued, the symptoms tend to become more severe, and may be associated with cyanosis (ashen grey and livid colour of the lips), shortness of breath, vomiting, anaemia, palpitation, bile-stained urine, constipation, rapid weak pulse, pains in

[1] No. 7, Industrial Fatigue and its Causes (Cd 8213), price 1½d. No. 8, Special Industrial Diseases (Cd. 8214), price 1d. No. 9, Ventilation and Lighting of Munition Factories and Workshops (Cd. 8215), price 1½d. No. 10, Sickness and Injury (Cd. 8216), price 1½d.

the limbs, and jaundice. In a few cases profound jaundice, with danger to life, has supervened, and even death has resulted.

Other explosives discussed are tetryl (tetra-nitro-methyl-anilin), during the manipulation of which a light dust, which may cause troublesome eczema, is produced; and fulminate of mercury, which involves the liability to mercurial poisoning and eczema.

There is a section on tetrachlorethane, which is a solvent for acetate of cellulose, and is an ingredient of the dope varnish applied to the canvas coverings and tapes of aeroplane wings and bodies, in order, by impregnating them with cellulose, to render them impervious to moisture and air. The poisonous effects of this substance were discussed by Dr. W. H. Willcox in the JOURNAL of February 26th, p. 301.

It is pointed out that the demand for explosives, nearly all of which are products of nitration, has introduced increased risks of exposure to nitrous fumes, which arise not only in nitrating substances involved in the manufacture of explosives, but also in the manufacture of nitric acid itself. Here reference is made to a memorandum recently issued by the Factory Department of the Home Office.

There are notes also on lead and on the dermatitis which may be produced by some of the substances already mentioned, and also by contact with certain fluids used to lubricate and cool metals in engineering works.

Memorandum No. 10, dealing with sickness and injury, is a continuation of No. 8. It points out that facilities for prompt treatment of all cases of sickness and injury are of special importance in factories where poisonous substances are used, that organization of treatment is necessary, and that it may be of a simple kind. A local dressing station or aid post should be established in each workplace for minor injuries, and a central dressing station or surgery for more serious cases, or those requiring continuous treatment. The aid post should be under the care of an officer (preferably a foreman or forewoman) trained in first-aid work, and the central dressing station in charge of a competent person with knowledge of ambulance work, with a trained nurse on regular duty, ambulance assistants being selected from employees trained in first-aid work. It is stated that many large works now have a medical officer on the staff who is responsible for the supervision of the surgery, and available for serious cases before removal to hospital.

We would counsel all medical practitioners who practise in districts where munition works exist to obtain copies of these two Memorandums (Nos. 8 and 10). They can be obtained through any bookseller.

Memorandum No. 9 deals with the ventilation and lighting of munition factories and workshops, and has an appendix discussing localized exhaust ventilation.

The memorandums[2] issued by this Committee, though they vary in interest, are all of importance and are well worth preserving; the Committee, indeed, seems to be in the way of producing a sort of handbook on industrial diseases which, though it will have special application to certain industries, will deal with many questions of general application to all workshops and factories.

[2] Notes on previous memorandums have been published in the JOURNAL of December 11th, 1915, pp. 863, 865; January 15th, 1916, p. 102; February 19th, p. 282.

MADAME DARD, widow of Dr. Dard of Dijon, has left the whole of her estate, after the payment of certain legacies, to the Association Générale des Médecins de France. It is estimated that the association will receive £40,000 to be used for the benefit of the widows and orphans of members.

THE Italian Society for the Study of Malaria, of which Professor Angelo Celli was the founder and the animating spirit, is appealing for funds to be applied to the erection of a monument in his memory in the Roman Campagna, the scene of Celli's efforts in the battle against malaria. Subscriptions may be sent to the treasurer of the society, Professor Allessio Mazari, Via Agostino Depretis 92, Roma.

AT a meeting held on March 6th the trustees of Columbia University, New York, decided to admit women as students in the medical faculty as soon as the present school buildings can be altered to furnish proper accommodation for the purpose. For more than twenty-five years efforts have been made to induce the authorities to open the medical department to women.

NATIONAL ASPECTS OF MATERNAL AND INFANTILE MORTALITY.

A REPORT on maternal mortality in connexion with childbearing and its relation to infantile mortality[1] has been prepared by the medical officer of the Local Government Board in England, in continuation of previous reports dealing with other aspects of the subject.

The present report is divided into four parts. The first deals with the decline of the birth-rate and death-rate, and with variations in infant mortality; the second and third with the maternal deaths in connexion with childbearing and their causes; and the fourth with public health administration in relation to maternity.

In his introduction Dr. Newsholme says that the report shows "that childbearing is still associated in some parts of the country with very excessive mortality, and in every part of the country with much avoidable sickness and mortality," and adds: "In order to secure healthy infancy and childhood it is necessary that, both during pregnancy and at and after the birth of the infant, increased maternal care and guidance and medical assistance should be provided."

The maximum birth-rate recorded in England and Wales occurred in 1876, when it reached 36.3 per 1,000 of population; since then it has fallen, and in 1914 it was 23.8. The total number of births in 1914 was 878,882, but if the rate of 1876 had been maintained it would have been 1,346,719. The apparent shortage is, therefore, in round numbers, 467,000. The effect of this fall upon the total population of the country has been masked by the decline in the national death-rate which has also occurred, so that the rate of natural increase of the population in 1901–11 remained as high as in 1891–1901. Emigration, however, reduced the rate of increase by 1 per cent. in the last decade. While admitting that the national death-rate can still be largely reduced, Dr. Newsholme points out that, "as the average age of the population increases, the possibility of maintaining the present natural increase by maintenance of the present birth-rate, and by saving of lives will diminish. . . . If contemporaneously the present rate of decline in the national birth-rate continues, it is not difficult to foresee that eventually births and deaths will balance, and the population of England and Wales will, apart from migration, become stationary as it becomes older."

Statistics are quoted from the Census Report, 1911, showing the total increase of population in certain European countries during thirty years. Expressed in percentages they are:

	United Kingdom.	England and Wales.	German Empire.*	Belgium.*	France.
1881–1891 ...	8.2	11.7	9.3	9.9	1.8
1891–1901 ...	9.9	12.2	14.0	10.6	1.6
1901–1911 ...	9.1	10.9	15.2	10.9	1.6

* Period 1880–1910.

The influence of migration on the population of Ireland and Scotland is probably the cause of the discrepancy between the figures for the United Kingdom and for England and Wales; and this seems to be confirmed by the fact that the loss of England and Wales through migration in the several periods appears to have been 2.32, 0.22, and 1.54 per cent. respectively.

Such statistics illustrate the national importance of the subject, and when every allowance is made for the effects of emigration, they do not materially touch the validity of the conclusion that the diminution in the rate of increase in the population of the United Kingdom is due to the diminution of the ratio of the number of infants born to the population.

The phenomenon is not peculiar to this country, and is not in it so marked as in some others, so that its causes must be looked for in general conditions which are affecting all the nations of modern Europe, as well as the Overseas Dominion and apparently the United States of America also, for the statisticians of the United States have concluded that the birth-rate has been declining very rapidly among Americans of the second and later generations.

[1] Cd. 8085. Price 7½d.

The following table,[2] compiled by Dr. Louis Parkes, exhibits what has been happening in a compendious form:

Table showing the Decrease in the Mean Birth-rates between 1887–8–9 and 1910–11–12, a Period of Twenty-three Years.

7-9.	5-7.	3-5.	Increases.
Hungary ... 8.2	Austria ... 6.7	Norway ... 4.9	Bulgaria ... 3.6
Australia ... 8.0	Belgium ... 6.4	Sweden ... 4.6	Ireland } 0.3
Serbia ... 7.8	Italy 5.8	Denmark ... 4.5	Roumania }
Germany ... 7.7	Finland } ... 5.4	France ... 4.1	
England and	Scotland }	Spain ... 4.0	
Wales ... 7.0	Netherlands... 5.3	Russia .. 3.7	
	New Zealand 5.0	Switzerland 3.3	

It is evident from this table that, with the exception of Bulgaria, with a decided increase of 3.6 in the birth-rate, and of Ireland and Roumania with very slight increases, the birth-rates of most of the other nations which furnish registration statistics have been lowered in the course of the last quarter of a century, and some very considerably lowered. It is now generally admitted, both in this country and abroad, that the lowered birth-rate is not due to natural causes, such as a higher average age at marriage, or to a natural decrease of fertility, or even to a lower rate of illegitimate births. It is believed to be due, in most part, to voluntary restriction, the general incentives to which must be universal amongst the nations, and must be of very various character, the kind of incentive that is effective in Australia or New Zealand differing materially from that which is operative in Hungary or Serbia.

Dr. Parkes expressed the opinion that in the more highly civilized and industrialized countries the causes were a desire for a higher standard of social comfort, a disinclination on the part of married women to devote all their lives and energies to the rearing of the future race, and their desire for a larger share in the political and other privileges enjoyed by men, combined, in the case of both parents, with a doubt as to what the future may have in store for the offspring. Amongst the more intelligent of the working classes there may be fears of over-population, of periodical trade depressions and unemployment, and amongst the middle classes similar fears, due to the overcrowding of the professions and the uncertainties of a commercial career, where trusts and great trade combinations seem to hold the field. "With more occupations open to women as the result of the war, or of political changes following the war, both single and married women will have careers open to them which will in the mass militate against a high rate of national fecundity; and we may," he considers, "expect that social changes of this character will accentuate the further fall of the birth-rate for some years to come, which must result from the destruction of so many males who in the natural course of events, if unmarried, would have become husbands and fathers, and, if married, would have increased the number of their children."

The main topic of Dr. Newsholme's report, however, is the consideration of means the State and municipalities can take towards the reduction of infant mortality. Over 21 per cent. of the deaths of infants under a year old, and nearly 33 per cent. of the total deaths in the first five years of life, are due to infective diseases, including measles, diarrhoea and enteritis, whooping-cough, and tuberculosis; manifestly many of these deaths could be prevented if we knew how. In the case of measles and whooping-cough we do not, and in the case of the others results have so far fallen short of expectations.

A hopeful sphere for salvage work is to be found among the causes of death due to conditions operating at or before the birth of the infant. Those attributed to premature birth, atelectasis, and injury at birth, account for no less than 23.6 per cent. of the deaths in the first year of life, and for 15.4 per cent. of all deaths in the first five years. Over 12 per cent. of infantile deaths are ascribed to "atrophy, debility, and marasmus," and of these probably a large portion are due to antenatal infection, and therefore preventable also. The effect of syphilis in causing deaths, post-natal, but much more antenatal, is for various reasons hidden under the present system and scope of infantile deaths registration.

We need not now attempt any detailed examination of the parts of the report which deal with the maternal loss of life from puerperal fever and from other accidents and diseases of pregnancy and childbirth, since the facts are well known and admitted. So new is much of the work included within the scope of antenatal clinics, prematernity wards, prenatal nurses, and the like, that it has not yet found its way into the textbooks of midwifery. Antenatal care is the application of preventive medicine to pregnancy in the common interest of both mother and infant; the antenatal clinic may play a large part in it, directly among the wage-earning classes and indirectly among others. It may perform at least five functions: (1) The expectant mother may be advised as to the special hygiene of her condition, and as to the best preparations for the birth of her infant; (2) much needless suffering may be avoided by giving advice and treatment for the minor disabilities of pregnancy, such as dyspepsia, constipation, varicose veins, and bad teeth; (3) more serious conditions, such as albuminuria, with its veiled threat of eclampsia, can be looked for, discovered in time, and treated with success; (4) in the case of patients attended by midwives arrangements can be made to obtain medical assistance if needed; and (5) the conditions which bring an expectant mother in an exhausted state to face the strain of labour can be avoided, and, if necessary, unsuitable home conditions may be replaced by more favourable hospital ones. Such experience as there is tends to show that women, if they are suffering, will go to an antenatal clinic, when they know of its existence.

It would be a mistake to promise much until we know a good deal more, but it can hardly be disputed that work along the lines of maternity and child welfare centres, such as infant health visiting, infant consultations, and schools for mothers, has already done much good in all districts in which it has been widely and wisely applied. This is well brought out by some statistics for Chelsea given by Dr. Parkes, showing, among other things, the birth-rates and infantile mortality-rates in the whole borough and in certain limited classes.

Table showing Birth-rate, Infantile Mortality-rate, Death-rate, and Rate of Increase in Chelsea (Census Population 66,385).

3-year Periods.	Birth-rate.	Infant. Mort. Rate.	Death-rate.	Rate of Increase.
Chelsea Borough.				
1906-8	21.9	121	16.3	5.6
1909-11	20.0	106	15.3	4.7
1912-14	18.7	77	13.9	4.8
Industrial Dwellings, Superior Class. Population 1,250.				
1906-8	36.0	67	11.2	24.8
1909-11	28.0	75	8.8	19.2
1912-14	26.4	81	10.4	16.0
Industrial Dwellings, Inferior Class. Population 1,265.				
1906-8	30.8	138	19.8	11.0
1909-11	30.8	119	19.0	11.8
1912-14	26.1	71	11.9	14.2
Seven Streets, Lowest Wage-earning Class. Population 3,150.				
1906-8	37.6	180	25.0	12.6
1909-11	37.4	141	24.4	13.0
1912-14	36.8	86	18.7	18.1

The figures are in some instances too small to justify any wide conclusions, but so far as they go they confirm the general belief that the decrease in the birth-rate has been most pronounced in the upper, and the decrease in the infantile mortality-rate in the lower, strata of the population. They suggest that much may be done by wise administration to safeguard infant life, but when we note that the infantile mortality-rate in the intermediate class is lower than that for the whole borough, and in the lowest wage-earning class not much above, the thought will arise whether, for further improvement in the future, we must not rather look to the antenatal clinic, which may tend both to increase the birth-rate by diminishing abortions and stillbirths, and decrease the infantile death-rate by diminishing the number of babies born only to die.

[2] *Journal of the Royal Sanitary Institute*, vol. xxxvi, No. 12.

British Medical Journal.

SATURDAY, APRIL 1ST, 1916.

SURSUM CORDA.

THE conferences of representatives of local Medical War Committees held last week in Leeds, London, Birmingham, and Bristol, while they afforded opportunity for the discussion of difficulties and ventilation of criticisms of the action and composition of the Central Medical War Committee—criticisms which that Committee is glad to have, and by which it will endeavour, as far as possible, to benefit—gave good reason also to hope that the profession has determined to live up to the great example it has set to all professions and callings during the last twenty months, and to take advantage of the splendid opportunity it now has of completing its task.

The difficulties of the men who may have to go have already received, and must continue to receive, much attention. None of us ought to rest content until everything has been done that can be done to send off the man who has to go with an assurance that his sacrifice is appreciated, and that it will be minimized as much as possible. But let us fix our eyes for a time on the prize to be won instead of the difficulties in the way.

The prize to be won is the proud satisfaction that the medical profession shall have succeeded in providing all the doctors needed by the army of its own free will and by its own efforts. When this war is over there will be a reckoning up. The public knows that the profession has come forward well; it does not realize perhaps how well and at what sacrifices. But when the day of reckoning comes, there are those hanging back now who will wish that they had done more to help their country. The medical profession has much to be proud of in its war record, but the next few weeks will show whether it is to have the distinguished honour of so organizing itself to meet the needs of the army and the civil community that the War Office, when it needs medical men, will only have to ask with the certainty of obtaining as many as are required.

The opportunity is indeed very great. Let us suppose that at this time some organization could approach the Prime Minister and the Secretary of State for War with an offer to relieve all their anxieties as to getting the number of men required for the army. Would not its offer be sure of ready, even enthusiastic, acceptance? But if that same organization was able not only to undertake to provide the men but to do so in such a way as to embarrass as little as possible the civil community, would it not receive the fervent thanks of the whole country? So far as the medical service of the army, to which it owes its first duty, is concerned, the profession is at the present time within reach of being able to make such an offer. The enrolment scheme of the Central Medical War Committee will provide a reserve of medical men of military age from which all the requirements of the army can be met with the minimum disturbance of civil arrangements and the minimum inconvenience and loss to the medical men who go. It is a magnificent opportunity, of which the profession must not fail to take advantage. What is the alternative?

It may be taken for granted that the Government will see that the army gets all the doctors it needs, and will, if necessary, use compulsion. There is, we know, a feeling among some medical men in favour of compulsion, on the ground that by it all unfairness would be eliminated. But the success of the enrolment scheme will eliminate all possibility of unfairness, and the result will have been achieved by the efforts of the profession alone. The next few weeks will show whether the profession has sufficient imagination to win for itself this unique distinction. It is the more to be desired that the voluntary enrolment should be successful because the difficulties of the situation, so far as the medical profession are concerned, would be little, if at all, diminished by compulsion. It is true that compulsion would prevent any medical man from hanging back, but all the other difficulties of the situation would remain. It would be no easier to protect the practice of the man who is compelled to go, and compulsion would in no way lessen the difficulties of distributing the work among the men who remain. The chief merit of the enrolment scheme is, as the *Times* pointed out last week, that "it gives full weight to professional opinion. It is no hard-and-fast system of conscription, but a system designed to secure fair treatment and adequate compensation. Doctors will be relieved of the difficulty of deciding whether they should go or stay in civil practice; those who go will have their interests looked after; those who stay will still be afforded full opportunity of serving their country." Undoubtedly it is an essential part of the scheme that those who go shall have their interests looked after; this can only be carried out through the formation of strong local opinion in every district, first in the profession and afterwards among the public. In some areas local war committees have made very careful collective arrangements for protecting the interests of the men who have gone or who may have to go. In other areas men who have gone have made their own arrangements with their neighbours or with locumtenents.

However well private arrangements may have been planned, the fact remains that the man who goes will feel greater confidence that they will continue to be satisfactory if he knows that there is a representative body of his own profession exercising general supervision, and ready at any time to come to the rescue in the event of an unexpected breakdown, due, for example, to the illness of his deputy.

Let it be repeated that the profession now has the opportunity of making a unique gift to the country. If, as there seems good reason to hope, it makes enrolment a success, it will be able to offer to the nation a profession organized for the purpose of both civil and military service. Nothing less ought to satisfy us.

EPIDEMIC JAUNDICE.

EPIDEMIC catarrhal jaundice is a commonplace in the textbooks of medicine, but probably rare in the experience of most British practitioners, although several limited outbreaks have been recorded in this country. Owing to the fact that Weil gave the first thorough description of an epidemic type in 1886, the name Weil's disease is often applied to all forms of infectious jaundice, but it is in the highest degree probable that epidemics of jaundice may be

due to more than one type of infection.[1] The War Office memoranda to which reference is made at page 500 distinguishes three types associated with infection—(*a*) the catarrhal, accompanying and complicating infective conditions; (*b*) toxic, or so-called camp jaundice, also commonly known as epidemic or infectious jaundice; and (*c*) "the so-called Mediterranean yellow fever, or Weil's disease," which, it is added, may be regarded either "as a form, and sometimes a malignant form, of toxic jaundice, or better perhaps as a disease *sui generis*, the etiology of which is obscure."

A disease which agrees clinically with Weil's description is both endemic and epidemic in western Japan, and quite recently its etiology has been established by the prolonged and painstaking experimentation of a number of Japanese physicians and pathologists.[2]

In Japan the disease takes the form of a febrile jaundice with congestion of the conjunctivae, muscular pains, albuminuria, and a tendency to haemorrhage. In 1914 an epidemic of 178 cases was observed near Tokyo, in the eastern part of Japan. The disease is due to infection with a new organism, the *Spirochaeta icterohaemorrhagica*. The authors appear to assume that Weil's disease in Europe is identical with the febrile jaundice observed in Japan, although, as they point out, certainty here will depend on the discovery of the Japanese *Spirochaeta icterohaemorrhagica* in the blood and tissues of the European patients. They also believe that Griesinger's "bilious typhoid fever" may be identical with Japanese Weil's disease, although the mortality in the former is 60 or 70 per cent., while it is but 32 per cent. in the latter; it is natural to believe that Weil's disease may vary widely in severity at different times and in different places.

The discovery of the new spirochaete was announced a year ago. Various animals were inoculated with the blood of patients taken during the first week of the illness; it was found that the guinea-pig developed an acute jaundice with albuminuria, haemorrhages, and conjunctival haemorrhages. The same organism, a spirochaete, was recovered both from the patients and the experimental animals that took the disease. After the seventh day of the disease the patient's blood often seemed to be free from the spirochaetes; the guinea-pigs developed the jaundice after an incubation period of from six to thirteen days, usually a week. The infection could be transmitted also from one guinea-pig to another; the oldest of the authors' strains has long passed its fiftieth transmission. The transmission could be effected by intraperitoneal, subcutaneous, or oral injection, and even by inoculation through the shaved but otherwise uninjured skin. Rabbits were found to be comparatively insusceptible to the disease, while guinea-pigs appeared to be more susceptible to it than man. Microscopical examination showed that the spirochaetes occurred in the blood and phagocytic cells of the guinea-pig; in man they were also to be seen in the liver cells, a fact that may explain the occurrence of bactericidal substances in the blood of human beings with Weil's disease after the second week.

It appears that the new spirochaete, like that of recurrent fever, is an organism living in the blood; it is also seen in the interstitial tissues. In length it measures from 4 μ to 25 μ, averaging 6 μ to 9 μ in the blood and 8 μ to 9 μ in the liver cells of man. The thickness is probably 0.25 μ. The ends are sharp and in most cases hooked; the undulations are irregular, with two or three large and four or five smaller waves. No membrane has been seen nor have flagella been recognized. Staining may be effected with Giemsa's solution or by Loeffler's method; when unstained the spirochaetes are invisible except under dark-field illumination. When present in large numbers, some appear to be filter passers, using Berkefeld candles. Their mode of multiplication is as yet uncertain, but this probably takes place by transverse segmentation. They can be cultivated by Noguchi's method, using guinea-pig instead of rabbit kidney; the optimum temperature is 22° to 25° C. The cultures are odourless and clear, and contain the spirochaetes uniformly disseminated throughout the ascitic fluid; the cultivated organisms resemble those obtained directly from the animal body.

Discussing the mode of infection in Weil's disease, the authors put forward the interesting and novel view that it often takes place through the skin rather than through the alimentary tract, as Weil believed, or by means of the bites of insects. This method of infection would explain the fact that the disease is readily picked up by Japanese workers in wet coal mines, with or without abrasions of the skin. The clerks working outside the mines, the workers occupied in dry mines, and the inhabitants of the workers' barracks do not seem prone to the infection. As for the way in which the spirochaetes are excreted by the patients, it is found that these organisms appear in the urine at an early stage of the disease, diminishing in numbers after three or four weeks, and disappearing before the fortieth day.

Examination *post mortem* in twelve fatal cases showed that the spirochaetes were always present in the kidneys in large numbers, but were fewer in the liver and other organs and tissues. There were many more organisms in the tissues of the experimentally infected guinea-pigs than were found in the human subject. It therefore appears desirable to regard the urine as the chief source of infection in Weil's disease, a matter of great importance from the point of view of prophylaxis. So far as treatment is concerned, both salvarsan and the serum of immunized goats and horses give good results in the guinea-pig infected with the spirochaete, so that there is a sound experimental basis for the clinical use of these substances in human beings with Weil's disease.

It is always satisfactory to have a severe infectious disorder of unknown etiology, such as Weil's disease has hitherto been, removed from this large category and put into the list of acute specific fevers of known causation. The authors of the paper now before us appear to have effected this transposition very thoroughly, and to have produced ample experimental evidence of the correctness of the decided views they express. Their *Spirochaeta icterohaemorrhagica* may be accepted as an important addition to the list of organisms producing specific infectious disorders; not the least important part of their work is that illuminating the treatment of the patients stricken with Weil's disease.

[1] On this point reference may be made to the report of a discussion on jaundice at Alexandria published in the BRITISH MEDICAL JOURNAL of February 26th, p. 320.

[2] R. Inada, Y. Ido, R. Hoki, R. Kaneko, and H. Ito, *Journ. Experim. Med.*, New York, 1916, xxiii, 377.

THE TOXICOLOGY OF SALVARSAN.

THE arsenical derivative of benzene[1] introduced for the treatment of syphilis by the late Professor Ehrlich in 1910, and named by him salvarsan, together with its chemical congeners neo-salvarsan, invented in 1912,

[1] Dr. Willcox uses the word "benzol," which is, we believe, a German form not generally accepted by English chemists.

and sodium-salvarsan, in 1913, are now generally recognized as the most rapidly acting and most powerful of the drugs at our disposal for curing that disease. So far as this country is concerned, the import of these drugs came to an end with the outbreak of the war in 1914. The result has been that the manufacture of salvarsan has been undertaken here, and the attempt has met with success; the British drug of the same chemical constitution as salvarsan has satisfactorily passed stringent chemical, physical, physiological, and toxicological tests; it has received the sanction of both the Board of Trade and the Medical Research Committee, has been placed on the market under the name "kharsivan," and has been widely employed in this country during the last few months. Most of its users will agree with the opinion expressed by Lieutenant-Colonel Willcox, after the elaborate investigations recorded in his important paper printed on another page of this issue, that it is "practically identical in its physiological and therapeutic effects with salvarsan." Naturally, however, one may expect to find differences of opinion here, the more so because "substitutes" that are "just as good" as the original article are looked upon with disfavour in this country. In addition there is among us an ingrained tendency, which is wholly unjustifiable, to regard the German chemists as superior in ability to our own in the manufacture of synthetic drugs. It is therefore highly satisfactory to find a physician and toxicologist with the experience of Lieutenant-Colonel Willcox making so definite a statement in favour of our home-produced drug kharsivan, as the result of experiments made by himself.

Salvarsan has always been a drug of the proprietary class, made in an atmosphere of mystery under a patent giving a misleading account of its preparation, produced at a small cost and sold at a very high price. It is, therefore, a matter of no little interest to read the chemical tests for its purity described by Lieutenant-Colonel Willcox. The doses tolerated by various animals have been worked out very thoroughly by Hata, Castelli, and others, for both salvarsan and neo-salvarsan. The mode in which the drugs act is implicit in the words "organotropic" and "parasitotropic," and may be illustrated by Ehrlich's experience with the drug atoxyl, the sodium salt of para-aminophenyl arsenic acid, with which, following Koch, he began to work in 1902. It was found that some varieties of trypanosomes were abnormally resistant to atoxyl or "atoxyl-fast"; while, on the other hand, numerous human beings were abnormally sensitive to its action, so that atoxyl was organotropic—or, more precisely, neurotropic—when administered to them, anchoring itself to the patient's nervous tissues rather than to the parasites infecting him, and producing atrophy of the optic nerve. Ehrlich, as is well known, held strongly to the maxim that drugs act only on the tissues with which they are chemically combined, and illustrated his view by the somewhat coarse mechanical analogues represented in his side-chain theory. There is a tendency on the part of physical chemists to replace his chemical conceptions by physical notions, processes of colloidal precipitation, alterations in the permeability of cells or cell membranes, and changes in surface tension or adsorptive power. The two methods of explanation, however, are not incompatible in essence, and both depend in the last resort upon Ehrlich's fundamental principle, expressed sententiously enough in his aphorism, *Corpora non agunt nisi fixata*—"substances act only when combined."

Lieutenant-Colonel Willcox gives an admirable account of the toxic and even fatal symptoms that may result from the exhibition of salvarsan or kharsivan. As he points out, the pathogenesis of many of the fatal accidents is still obscure. They are not to be explained by anaphylaxis, and to refer them to "a profound autointoxication such as occurs in uraemia" does little to explain their occurrence. It is interesting to learn that the central nervous system is here found to be almost free from arsenic, the inference being that the death was not caused by the action of arsenic as such upon the brain or cord. It appears that the arsenic accumulates in the abdominal viscera for the most part, and to a less extent in the muscles and blood.

Professor Ehrlich himself was inclined to attribute death from salvarsan to excessive vaso-dilatation, as will be seen by reference to a letter he sent to this JOURNAL in 1914;[1] and for the treatment of the dangerous symptoms that may make their appearance after injection of the drug he recommended the immediate and repeated administration of adrenalin. He believed that even the extreme cerebral vaso-dilatation implied in the term "haemorrhagic encephalitis," with its subsequent cerebral oedema and circumvascular haemorrhages, might yield to the prompt exhibition of adrenalin, the patient recovering even from a condition of coma.

From the practical point of view perhaps the most important part of Lieutenant-Colonel Willcox's paper is that in which he gives an account of the modes of administration of salvarsan and neo-salvarsan, and the methods to be employed in combating the unpleasant symptoms, mild or severe, that may follow its use; for it is likely that these drugs will soon be employed in increasing quantities, now that the report of the Royal Commission on Venereal Diseases has been published. The dwellers in towns and cities, who are the chief victims of syphilitic infection, will no doubt receive the advantage of increased facilities for the diagnosis and treatment of their disease, because the Commission urges the necessity of encouraging existing institutions to bestir themselves in this direction, and recommends that they should be subsidized for the purpose from both imperial funds and the local rates.

THE RELATION OF THE EYES TO RIFLE SHOOTING.

A PAPER published some time ago by Dr. Roderic O'Connor,[2] upon the visual problems of rifle shooting, deserves careful study. To quote Mr. Roosevelt: "The shots that hit are the shots that count. The most valuable fighting man, and the one most difficult to perfect, is the rifleman." Other things being equal, the ability of troops which are armed with the rifle to inflict damage will vary directly with their shooting ability. It is therefore important to take advantage of all possible aids to an increase of the shooting ability and to avoid all hindrances to that end. The army standard of vision is not high, and many soldiers require glasses to enable them to shoot with any degree of accuracy. Of late, numerous writers have tried to prove that good shooting is possible with poor vision, one authority stating that as good shooting can be done by a man having an acuity of $\frac{6}{15}$ as by one with full acuity. He believes that as long as a man can see the front sight clearly he can be a good shot, even though the bull's-eye is blurred. Dr. O'Connor seeks to prove that this view is erroneous. In rifle shooting it is necessary to focus three points—the target,

[1] BRITISH MEDICAL JOURNAL, 1914, i, 1014.
[2] *Ophthalmology*, July, 1915.

the front and the rear sights. It is therefore essential with the usual military sights that the soldier shall possess good power for accommodation to enable him rapidly to focus these objects in succession. When alignment has been secured, the bull's-eye is seen in focus by direct vision, the sights are seen blurred by indirect vision. A presbyope cannot shoot well because he cannot focus the rear sight, and if he use spectacles which clear the sight the target is blurred. The use of a peep-sight enables a presbyope to shoot, and makes it easier for all eyes because there are then only two objects to focus. The act of looking through the peep-sight aligns the sights automatically upon the object, and the rear sight has never to be focussed. Dr. O'Connor considers that the peep-sight close to the eye should be adopted. The aperture should be 1 mm., and the sight should be 1 in. from the eye. The peep-sight being close to the eye increases the space between the sights and so makes for accuracy in aim. It also increases the acuity of those who have errors of refraction and reduces glare. To demand with the author that combatants in the line, signal corps, and engineers shall have $\frac{6}{6}$ vision, binocular vision, normal colour perception, and good accommodation, would be, we fear—at any rate, in present circumstances—a counsel of perfection.

BROWN-SÉQUARD EPILEPSY.

IN 1869 Brown-Séquard described the production of epileptic attacks in guinea-pigs by violent stimulation of the sciatic nerve. Since that time a number of cases have been recorded in medical literature in which epilepsy supervened in human beings after, and apparently as the result of, severe injuries of the peripheral nerves. A few of these have been collected by Drs. A. Mairet and H. Piéron,[1] who remark on the rarity of these cases, and add two more of their own observation. One patient, a railway employee, had his right hand crushed under the wheel of a carriage in 1886. After this he was only fit for light duty at the railway station. In 1890 he was dismissed for offences against decency in public. He went to law about it, and the medico-legal experts found he was suffering from chronic neuritis of the right arm and attacks of epilepsy. It appeared that the neuritis had been confined at first to the ulnar nerve, and had spread so as to involve the whole brachial plexus; while the epilepsy might take several forms culminating in true epileptic seizures, and could often be provoked by pressure either on painful spots on the scar left by the injury or on the tender ulnar nerve. The second patient, a soldier aged 30, was wounded by fragments of a shell in the right forearm in September, 1914. The wounds healed in December, after much suppuration, leaving extensive scars. In January, 1915, the man complained of headache, vertigo, and noises "as of aeroplanes" in the ears. Attacks of stiffness and tremor of the limbs, with loss of consciousness, occurred both by day and night. When seen in hospital at Montpellier in April the right arm was weak and wasted, and there were various areas of loss of sensibility, hyperaesthesia, and hyperalgesia. The musculo cutaneous and internal brachial nerves were thickened and tender; other branches of the brachial plexus and cervical nerves seemed to be affected as well. There were no signs of neurasthenia. While in hospital the patient had two or three epileptic or epileptiform attacks daily, varying in degree of severity, preceded by an aura of pains in the right arm and culminating in stiffness and clonic spasms, with loss of consciousness lasting for many minutes. Minor attacks could be brought on by pressure on the musculo-cutaneous nerve. Some improvement was produced by electrical treatment. In June the brachial scars were excised under ether, but the epileptic attacks returned. In August and September treatment of the arm by prolonged hot baths was undertaken—two hours in water at 104° F. twice a day. After three months the man was very much better; no fits had occurred after September, and the affected nerves were much less sensitive to pressure. The arm and hand were stronger, and were being treated by massage and movements. The authors consider this to be one of the rare cases of true epilepsy reflexly produced by severe peripheral irritation; the patient's family history of such as to suggest a predisposition to nervous disorders. Dr. Pierre Marie,[2] on the other hand, states that he has never been able to accept the convulsions described by Brown-Séquard in his experimental animals as comparable to epilepsy in human beings. He is inclined to attribute the phenomena displayed by Mairet and Piéron's second patient to hysteria or neuropathy rather than to epilepsy.

[1] *Bull. de l'Acad. de Méd.*, Paris, 1916, lxxv, 80.

PORTRAIT PAINTING AND PATHOLOGY.

CERTAIN portrait painters of world-wide renown are famous for their pictures of pathological specimens of humanity as well as for their portraits of more normal persons. The stock example of this slightly morbid turn of the artistic mind is Velasquez, whose pictures of the various royal dwarfs kept at Court by Philip IV of Spain will be remembered by all who have visited the Madrid Museo del Prado. In the same gallery there are numerous other portraits, painted by Goya and by El Greco, to mention but two names, of pathological specimens of humanity that, to the eye of a medical man, are faithful and unmistakable delineations of mental or bodily disease. And to come down to more recent times and our own country, anyone who has visited the exhibitions of the post-impressionists, cubists, futurists, *et hoc genus omne*, in the last decade, will no doubt have been struck by the abnormality of the types of human beings often depicted. The efforts of these artists, however, are not perhaps of the same artistic importance as those of the Spanish painters already mentioned, and do not call for or deserve the same serious consideration. But even the best known, most successful, and most orthodox of our portrait painters at the present time portray, or find themselves confronted by, sitters who exhibit to the eye of the medical man and pathologist most interesting variations from the normal. In the exhibition of the National Portrait Society now open are numerous works of sterling artistic merit and worthy of the highest praise; the collection is one that should be visited by all who are interested in the art of portraiture. The attention of medical visitors will be particularly arrested by the skill exhibited by not a few of the contributing artists in depicting various pathological abnormalities. Thus, there are portraits of sitters with such banal afflictions as goitre, arrested hydrocephalus, and kyphoscoliosis; in the last instance the sitter's hands are in view, and from the absence of onychocampe and clubbing of the finger tips the pathologist is perhaps justified in concluding that in this instance the kyphoscoliosis was not secondary to pulmonary disease, as it so often is. In another gallery is a good reproduction of the plica polonica, or matting together of a head of hair, that is rarely seen in this country but is *ex hypothesi* common in Central Europe. There are also pictures that seem to illustrate to perfection the harmful effects that may follow alcoholic excess. Taken together they form quite a temperance sermon in oils. Other pictures illustrate diseases that are less common. There is, for example, an excellent representation of acromegaly occurring in a young man; a picture of an older man suggesting chronic methaemoglobinaemia, possibly due to the habit of taking aniline-derivative drugs in excess. Another artist has chosen to portray the sitters in a curious light that gives them all the appearances of advanced *post-mortem* decomposition, and here we are presented with a pathological problem that is insoluble for it is evident that the sitters are alive and in

[2] *Ibid.*, p. 92.

the full enjoyment of life. Another picture gives a most successful rendering of left facial hemiatrophy, coupled with a slight degree of the torticollis that sometimes accompanies this rare morbid condition. Certain common disorders are rather noticeable by their absence in this admirable exhibition of portraits. Thus visitors to the annual exhibition of the Royal Academy may always count on seeing pictures of fair English girlhood suffering from enlarged tonsils and adenoids, or from anaemia, in fairly large numbers. In the exhibition now under consideration there is but a single case of well-marked anaemia, and only one or two portraits suggesting the facial deformities associated with chronic nasal obstruction. We cannot conclude this brief review without adding a word of praise for the skill and truthfulness with which the artists concerned have depicted the various conditions described.

"PANTEUTOMANIA."

THE moving pictures of the war have passed in such quick succession before our eyes that already the manifesto issued in the autumn of 1914 by ninety-three leaders of German thought has faded into ancient history and is now almost forgotten. This is, perhaps, a pity, for the document[1] throws a fierce light on the mentality of the German "intellectual." We are glad, therefore, that the Lisbon Society of Medical Sciences is distributing an address delivered by its President, Professor Ricardo Jorge, in which he deals faithfully with the manifesto and its authors.[2] He describes their deliverance as showing all the symptoms of a collective madness. We need not follow the orator in the torrent of his invective. But something may not unprofitably be said as to the process of mental perversion which has taken place in Germany during the last forty-five years. This Jorge traces in a striking manner. In 1870, he says, France lived imprisoned in her own vanity; for her there was then no science, no art, no literature but her own. A German psychological physician, Karl Starck, discussed this mental condition in a pamphlet published in 1871, in which he maintained that France was really suffering from a psychosis akin to paralytic dementia, or *folie raisonnante*, with predominance of the mania of greatness. The overthrow suffered by her in 1870 produced a great change of spirit, and the disease in turn attacked her conqueror. The symptoms showed themselves very early. In his *Study of Sociology*, published in 1873, Herbert Spencer quotes a German professor as writing to him: "There is, alas! no want of signs that the 'happy contrast to French self-sufficiency' which Germany heretofore displayed is disappearing 'since the glory of the late victories.'" An "esteemed German professor of philosophy" declared that the psychical and ethical sciences would not be advanced by international communion of thought, adding that "if this were possible he did not think it desirable, as it would interfere too much with the peculiarity of German thought." Thus, said Spencer's correspondent, "the finest German characteristics are disappearing in an exaggerated Teutonomania." Another professor contended, with perfect seriousness, that "only one thing is now wanted to complete our German institution, a national costume." Jorge contrasts the attitude of Virchow with the arrogance of the present day "intellectuals" who loudly proclaim their belief that Germany can do no wrong. In 1871 he warned his fellow countrymen of the dangers to which national vainglory would expose them. He added that German scientists were almost all opposed to war—a statement which reads curiously at the present day. It is easy to guess what the great man who made it would have thought about the "panteutomania," as Jorge calls it, from which the German people is now suffering. The Lisbon professor's address, which was delivered in December, 1914, was violently criticized by Professor C. Mense, editor of the *Archiv für Schiffs- und Tropen-Hygiene*, who speaks of him as an orator driven mad by the calumnies of the enemies of Germany and discharging his soul in a flood of injurious accusations. For this reason the *Archiv* declines further exchange with the *Medicina Contemporanea*, in which the address appeared. Jorge retorts that there could be no better proof of the truth of his view that Germany has gone mad than Mense's effusion. These professorial courtesies make one wonder what is to happen in the intellectual sphere after the war. One learned Teuton has already told the world that henceforth medicine is no longer to be cosmopolitan but wholly German. There are to be no more international congresses and no scientific intercourses between Germany and other countries. Another has declared that "Germany must and will stand alone. The Germans are the salt of the earth; they will fulfil their destiny, which is to rule the world and to control other nations for their good." But we need not be alarmed. The world will manage to get along without German medicine and surgery, for Germany depends much more for its ideas on Great Britain, France, and America than those countries do on her.

[1] Comments on the manifesto and the replies from a number of learned bodies throughout the world will be found in the BRITISH MEDICAL JOURNAL of October 31st, November 28th, and December 5th, 1914, and March 27th and July 24th, 1915.

[2] *A Guerra e o Pensamento Medico.* Portugal-Lisboa: Ediçao da Sociedade das Scienciae Medicas.

HAEMOLYTIC SPLENOMEGALIC JAUNDICE CURED BY THE X RAYS.

PROFESSOR G. JONA, of Venice, has recently described[1] the case of a youth of 18 with what he describes as a primitive acquired haemolytic acholuric splenomegalic jaundice of the Widal and Hayem type, who was cured by the *x* rays. The patient, when seen for the first time in 1912, was well nourished, anaemic and slightly jaundiced; the urine was free from bile pigment, but contained urobilin. The liver was soft and moderately enlarged; the spleen was enormously enlarged, reaching across the middle line and down to the fold of the groin, and the splenic dullness measured 34 by 19 cm. The faeces contained an excess of pigment; the blood examination showed 50 per cent. of haemoglobin, 2,900,000 red cells and 5,000 white cells per c.mm., with numerous nucleated red cells, anisocytosis, polychromasia, lymphocytosis, and diminished resistance to solutions of sodium chloride. In the eight examinations made of the blood, no malarial parasites were ever seen; the patient's temperature was normal during the seventy-five days he was in hospital. The blood serum contained bilirubin; Wassermann's reaction gave a negative result, and so did von Pirquet's test. After the patient had been treated for a month with Fowler's solution by the mouth and injections of green citrate of iron, without improvement, *x*-ray therapy was begun. A tube of moderate hardness (7–8 Benoist) was used with a current of a half to one milliampère 40 cm. from the patient, who was screened by an aluminium plate 1 mm. thick. Exposures lasted ten minutes, and were made in groups of three, the anterior, lateral, and posterior aspects of the spleen being irradiated on successive days. These three exposures were repeated at intervals of five days; twenty-one exposures were given between December 5th and January 19th, 1913. The patient's general condition improved at once, and so did his blood count; the spleen diminished in size but slowly, the dullness measuring 27 by 15 cm. in February, 1914; in August, 1915, the dullness measured 15 by 9 cm., and the spleen extended three fingerbreadths beyond the left costal margin, while the liver was normal in size. The haemoglobin reached 70 per cent. in January, 1913, 80 per cent. in February, 1914, and 100 per cent. in August, 1915, when there were still traces of urobilin in the urine.

[1] *Il Policlinico*, Rome, 1916, sez. med., xxiii, 17.

Professor Jona remarks that there was still a trace of jaundice about the patient in March, 1915. He discusses the case from various points of view, and gives a number of details about the blood examinations that cannot be reproduced here. He considers that the *x*-ray therapy produced the same results as splenectomy would have done, though more slowly; in 1914 Mühsam collected 14 cases in which the condition had been cured by splenectomy. Professor Jona quotes 2 cases of congenital haemolytic jaundice much improved by *x*-ray treatment of the spleen; he has not found any case similar to his own recorded in the literature.

ECONOMY IN PAPER.

The Royal Commission on Paper has issued a further appeal to the public drawing attention to the consequences of the restriction upon the importing of paper and paper-making materials which it has been appointed by the Government to carry out. The restriction reduces the import by one-third, and newspapers, journals, and magazines must correspondingly be reduced in size or weight, or both. The appeal is to the public to be economical in the use of paper, for the restriction of the supply of paper for printing has been for some time in force, and it has been necessary in the case of this journal, as in that of all its contemporaries, to reduce the number of pages and the weight of the paper. We would appeal to contributors to bear the fact in mind when preparing articles for publication. Our contemporary *Nature*, in its issue of March 23rd, announced that it has been found necessary to reduce the size of that valuable periodical, and made an appeal to its contributors to "confine themselves to essentials, points of prime importance, in order that our record of scientific work and events may still be as extensive as possible, though it must necessarily be less detailed." These words put the situation very well, and place the matter on a true ground. They are as applicable to medicine as to science in general. We are well aware that to be brief is troublesome, since it requires more concentration of thought and more labour in composition. It is well worth while to incur these extra pains in the interests of readers and of the advancement of science. The first draft of an essay almost invariably contains repetitions and redundancies, which can be eliminated not only with the saving of space but with increase in clearness.

It is announced from Paris that a sanitary conference of representatives of the Allied Powers has met there during this week for the discussion especially of the prevention of typhus and cholera, the destruction of rats —which are so serious a nuisance in the trenches—and of insects, and questions as to rations.

Medical Notes in Parliament.

Mesopotamia.

On March 23rd Mr. Tennant stated that the new arrangements for the control of operations in Mesopotamia came into force on February 16th, 1915. The commander-in-chief in India received instructions with regard to the military operations in Mesopotamia from the chief of the Imperial General Staff in exactly the same manner as the commander-in-chief in other theatres, but India remained the main base of the forces in Mesopotamia, which was administered by the commander-in-chief in India. Such requirements of the forces as India could not meet were supplied by the War Office from other parts of the empire so far as consideration of general policy did not render this impracticable.

Medical arrangements in Mesopotamia, Mr. Tennant also stated, were primarily under the control of the military authorities in India, but the commander-in-chief in India had been informed that the Army Council would render him any assistance in medical personnel and equipment. All demands had been met without delay; 120 medical officers, including 40 from Egypt and 205 other ranks, R.A.M.C., had arrived or were on their way. In addition, one British general hospital of 1,040 beds and one British stationary hospital of 400 beds had been sent from Egypt. Both these units were fully equipped. Four Indian general hospitals of 500 beds each, which were in this country, had also been sent. Two of these were fully equipped, and the remaining two consisted of personnel only. From France the Lahore Indian Stationary Hospital of 200 beds and 33 medical officers were under orders. A motor ambulance convoy—50 cars with complete personnel—was nearly ready, and would leave for Mesopotamia early next month. The commission, consisting of Sir William Vincent and General Bingley, after taking evidence in Bombay, left for Mesopotamia on March 10th. Asked whether these two public servants had any special knowledge or experience of medical requirements for an Eastern campaign, Mr. Tennant said that Sir William Vincent was a man of wide administrative experience and had proved efficient in high and responsible official posts, and that Major-General Bingley had had a great deal of staff experience and was well suited for an inquiry into alleged deficiencies in the organization of supplies. These two gentlemen were, Mr. Tennant considered, amply qualified to elucidate the facts and to make a fair, complete, and judicial report upon them, having reference to all aspects of the question. They could procure any technical and expert advice they desired.

In reply to a question by Lord H. Cavendish-Bentinck, on March 23rd, Mr. Chamberlain said that he had learnt that the Joint War Committee of the British Red Cross Society and the Order of St. John, in co-operation with the Indian Soldiers' Fund, offered general assistance direct to the general officer commanding Mesopotamia in July, 1915, and repeated their offer at later dates, and that stores were sent by them to Basra in September, two motor boats in August, and another in October. In December further offers on their behalf had been transmitted. On January 31st the Committee offered to place at the disposal of the Secretary of State the organization of the two societies to supplement the provision made by the Indian Government for the care of the sick and wounded in Mesopotamia. The offer was in the widest and most generous terms. It referred in particular to the possibility of helping in the supply of stores and clothing, medical comforts, drugs and luxuries not included in the scheduled army lists; in the supply of motor ambulances, barges and other vehicles, for the transport of the sick and wounded, and in the equipment of hospitals and the provision of personnel and staff to administer such hospitals. The offer was communicated to the Viceroy, who, having ascertained that its acceptance would not conflict with the organization and arrangements of similar Indian societies, informed the India Office that the Indian Council of the St. John Ambulance Association, which from the outset had actively concerned itself with the Mesopotamia force, would gladly accept assistance. In October, 1915, the Indian Soldiers' Fund made inquiry through the India Office of the military authorities in Mesopotamia as to whether clothing and comforts were needed for the troops, and was informed in reply that for the present the supply in India was sufficient. The Fund Committee had independent evidence that there were sufficient supplies at the base at that time. An offer from the fund transmitted to the Viceroy in December to supply bandages, medical and surgical dressings, and other hospital comforts was gladly accepted, and early in January a large consignment of articles, some contributed by the Joint Committee, was despatched to Mesopotamia. Other offers of which the India Office had no direct knowledge had been made to corresponding societies in India engaged in providing comforts for the combatants and medical supplies for hospitals.

On March 28th Mr. Gwynne asked whether, when the shortage of doctors and nurses and hospital equipment in Mesopotamia was realized by the Government, any endeavour was made to transfer some of the hospital equipment in Egypt not at present being used. Mr. Tennant replied in the affirmative. Aid, he said, was offered as soon as it was realized that aid was wanted.

War.

Army Medical Advisory Board.—Sir Philip Magnus, on March 23rd, asked whether the Government would consider the advisability of reconstituting the Advisory Board to co-operate with the general superintendent in the further organization of the medical service, and, if so, whether regard would be had to the suggestion that had been made by a number of medical men that such a Board should consist of some lay representatives. Mr. Tennant said that he took note of the suggestion, but could not admit that a case had been made out for interfering with the organization as it at present existed. In reply to Mr. McNeill, who asked whether it was not a fact that the Advisory Board was in existence when the war broke out, and that the neglect to call it together was without any proper authority, Mr. Tennant said that Mr. McNeill was misinformed as to the facts, although he (Mr. Tennant) had given him a description of what had occurred at the outbreak of the war in the recent debate. It was, Mr. Tennant added, quite within the competency of the military authorities to suspend the activities of the Advisory Board as and when they might think proper.

Medical Officers with Special Experience.—On March 23rd Sir Philip Magnus asked what steps were being taken to arrange that doctors with special experience in different branches of medicine and surgery who had joined the Royal Army Medical Corps were being employed by the War Office as to utilize to the best advantage their special qualifications. Mr. Tennant replied that every effort was made to employ gentlemen who joined the Royal Army Medical Corps in such a way as to give their individual qualifications every consideration. It was sometimes not practicable to use their services exclusively in one special line of practice, as the need for special work was limited. His information was that these gentlemen willingly gave their attention to work outside their special qualifications when work of that kind was awaiting attention.

Part-time Hospital Work.—Sir Philip Magnus on March 23rd asked a question as to the utilization to a greater extent in part-time work at hospitals, or in looking after the health of troops, of the services of medical practitioners resident in the neighbourhood, so as to release a proportion of the men who had volunteered for whole-time service abroad, or who had been asked to take commissions in the Royal Army Medical Corps. Mr. Tennant replied that the policy suggested was already followed. A considerable number of medical practitioners were already employed in part-time practice, and it was anticipated that this number would be largely increased.

Tuberculous Soldiers.—In reply to Major Astor, on March 22nd, Mr. Tennant said that the number of cases of tubercle of the lung treated out of army funds in hospitals in the United Kingdom on February 29th was 632. The information available did not make it possible to distinguish those who were suffering from consumption alone from those who were suffering from consumption and wounds or other injuries directly attributable to warfare. In reply to another question by Major Astor on the same day, the Chairman of the Joint Committee of Insurance Commissioners said that approximately 2,000 cases of tuberculous soldiers had passed through the hands of the several commissions in connexion with the special arrangements made in April, 1915, for the provision of immediate residential treatment for discharged tuberculous soldiers, and had been provided with treatment. In additon, it was known that a large number of soldiers who became, on or after discharge, eligible for sanatorium benefit had made application for the benefit direct to the local insurance committees, who had afforded treatment without reference to the Insurance Commissioners. The actual number of such cases—including, of course, many cases which arose before the special arrangements were established—could not be obtained without a special return from all insurance committees in the United Kingdom.

Cerebro-spinal Meningitis.—Mr. Chancellor asked a string of questions, on March 22nd, with regard to carriers of cerebro-spinal meningitis. Mr. Tennant, in his answer, said that two cases had arisen from contact with soldiers segregated as carriers at the Fulham Military Hospital; that a carrier of disease could, as a rule, be made not to be a carrier, and that it had been proved that cases of the disease had arisen from contact with persons not themselves suffering from it. Mr. Chancellor suggested that the advice on which the alleged carriers were treated was not based on anything more substantial than an unproved theory, not only not accepted but widely disputed and denied in medical circles. To this Mr. Tennant replied that the carrier theory in this and other diseases had been fully proved, and was widely accepted by the medical profession.

Steel Helmets.—In reply to questions on March 23rd the Minister of Munitions said that reports of a very satisfactory nature had been received on the steel helmets and the necessary steps had been taken to obtain a supply sufficient to meet the requirements of the War Office. A satisfactory pattern was approved some five months ago. Changes were being made to meet the improvements suggested by experience, but already over 300,000 had been delivered. On March 28th Mr. Tennant said that all battalions in the field will shortly be equipped with helmets either of the present or of an improved pattern.

Ration Allowance to Wounded Officers.—On March 22nd Mr. Burdett-Coutts asked a question as to an order of February 28th cutting off the ration allowance of 1s. 9d. a day previously paid to wounded officers. He pointed out that in existing circumstances the homes of many of these wounded officers were broken up when they joined the army, and that therefore the ration allowance when they were home on sick leave, perhaps for a long time, was a consideration to many of them. It had to be remembered that there was no separation allowance for the wives and families of officers. The Financial Secretary to the War Office (Mr. Forster), in reply, admitted that some of the considerations which should have carried weight were not sufficiently taken into account before the allowance was cancelled. The Government proposed to reconsider the question in a generous spirit.

Bonesetters.—In reply to a question by Sir A. Markham, on March 28th, Mr. Tennant said it was true that the War Office had declined to accept the services of Mr. H. A. Barker, together with those of several other gentlemen who were not registered medical practitioners. It was not the intention of the Army Council to direct the medical authorities to employ unqualified men to treat military patients. If this were done, Mr. Tennant added, he felt certain that from no quarter would there be a louder outcry that our soldiers were not receiving the necessary skilled attention than from members of the House of Commons.

WAR PENSIONS.

N.C.O.'s AND MEN.

THE total pension receivable by a man disabled in the war or by his widow or other dependants if he is killed, may be derived from two sources—the funds administered by the Greenwich and Chelsea Commissioners which are ordinary charges on army funds, and the funds at the disposal of the Statutory Committee of the Royal Patriotic Fund Corporation, set up under the Naval and Military War Pensions Act, 1915.

With regard to the pensions paid through army funds by the Chelsea Commissioners, the Financial Secretary to the War Office (Mr. Forster) made a statement on March 22nd. He began by saying that it had been suggested that there was a prevalent belief amongst wounded soldiers that it was undesirable from their point of view to qualify themselves by skill and industry for a trade, because if they did the mere fact that they had become sufficiently skilful to earn their living adversely affected their pensions. It should be clearly understood, Mr. Forster said, that in assessing pensions it did not matter what a man earned at the moment. What was taken into account was his capacity to earn. His pension was calculated on his physical condition.

It would, therefore, be clearly realized that the pension of a man who was earning nothing would be reduced if there was nothing in his physical condition to prevent him from earning, if so inclined. On the other hand, a man earning a very considerable rate of wages might at the same time be drawing a considerable pension. When a man had lost a limb he was treated by the Commissioners of Chelsea Hospital as totally incapacitated for a certain length of time, and he got the full rate of pension of 25s. a week for at least two months after he had been fitted with an artificial limb. It took time for a man to get accustomed to his new apparatus. The man got his full scale of pension for a certain time, say, six months, at the end of which his case was reviewed, his physical condition closely examined, and if the verdict of the doctors was that his physical condition was sufficient to enable him to earn his living to the extent of, say, one-half, his pension was reduced. It did not matter how much the man was earning at that time. If his physical condition was so much improved as to permit him in the open market to earn at least half of the full living, his pension was adjusted on that account, and not on account of the particular amount of money he might happen to be earning at the moment. He wished soldiers to realize that it did not pay them, and ought not to pay them, to refuse to take employment simply for the sake of retaining their pension at the highest scale. It was assessed not by the standard of what they earned, but according to their physical capacity.

In asking for a vote of £1,000,000 to the Statutory Committee, constituted under the Naval and Military War Pensions Act, 1915, the Parliamentary Secretary to the Local Government Board (Mr. Hayes Fisher) made a statement, in which he said that the duty of the Committee under that Act was to grant pensions to supplement those granted by the Greenwich or Chelsea Commissioners and to make provision for the training and employment of disabled soldiers and sailors. The Commissioners would make grants on scales laid down by the Committee on Supplementary Pensions in cases in which a consideration of the circumstances showed that the State pensions were not adequate either to the individual soldier or sailor or his dependants, and also grant pensions in cases of great hardship in which, for one reason or another, pensions had not been given to disabled soldiers and sailors.

The number of disabled men discharged as unfit from wounds and disease who had been awarded pensions and grants by Chelsea Hospital down to March 9th, 1916, was 30,255; 5,470 had received final pensions; 1,356 provisional pensions; and 23,429 conditional pensions, to be reviewed later. Pensions or grants had been refused in 15,105 cases by the Chelsea Commissioners, but that was before the concession made recently rendering it unnecessary for a man to prove that a disease from which he suffered was due wholly or directly to military service; pensions would be given where the disease had been aggravated by military service.

The number of cases of amputation notified to the main hospital at Roehampton down to March 1st was 3,818; of these, 1,628 had already been admitted to Roehampton, and 932 had been discharged with properly fitted artificial limbs, which were a vast improvement on those which used to be served out to the victims of former wars. At present there was a waiting list of 2,027, and cases were being notified at the rate of 300 a month.

With regard to the blind, some 200 had either passed through the training school at St. Dunstan's or would shortly pass through, but it was to be feared that the number would be very much larger before the war ended, and it would be necessary to provide another St. Dunstan, either by giving help to Mr. Pearson or by direct action. For the paralysed it was not possible to do more than provide a home, and this work was being undertaken by those who had started the big hospital at the old Star and Garter Hotel at Richmond. Special provision would also have to be made for nervous cases and would have to be continued for many years after the war.

The State pensions for a widow would be a flat rate—10s. a week until she was 35; 12s. 6d. from that age to 45; and 15s. afterwards. The total number of widows of N.C.O.'s and men reported by the Army Council to March 1st was 41,500. The separation allowance was continued for twenty-six weeks, and was still being paid to 18,394; 23,106 were actually in receipt of pensions; only 800 had been refused pensions. The number of widows of men in the navy who had been granted pensions was 4,180; the number in receipt of separation allowance was 420, and the number who had been refused pensions 48. Cases in which pensions had been refused would be considered by the Statutory Committee, and it would also consider whether pensions granted should in any cases be increased. The Statutory Committee had come to the conclusion that the income of a widow with children should be made up to two-thirds of the pre-war income, with a maximum of £2 a week. The Statutory Committee would also consider cases of hardship in relation to the education of children or due to exceptional sickness. In addition to approximately 50,000 widows, there were dependants other than widows and orphans who also numbered about 50,000; their case, as also that of persons not now in receipt of any pension, would have to be considered by the Statutory Committee. Mr. Hayes Fisher added that he did not expect the vote of a million now asked for would be sufficient. The National Relief Committee had spent over two millions already in extra separation allowances, mainly for extra rent, and the expenditure was now about £80,000 a month. In the course of a discussion Mr. Barnes recalled the fact that the Verney Committee had recommended the Government to set apart two millions to set up farm colonies, but this, it was estimated, would settle only about 5,000 families. The vote was agreed to.

Pensions for Nurses.

In reply to a question by Mr. Burdett-Coutts, on March 22nd, Mr. Forster said that steps had been taken to institute a special scale of pensions for those nurses who were disabled either by disease or accident wholly and directly due to service, or aggravated by service. The matter was discussed with the head of the nursing staff, the matron-in-chief, and he hoped that the House would be satisfied that the scale laid down was sufficiently generous to meet the case.

UNITED STATES.

The following notes founded upon the latest report of the Commissioner of Pensions (United States of America), for the use of which we are indebted to the courtesy of the acting commissioner through Mr. Lynn Thomas of Cardiff, are of interest in this connexion:

The (estimated) total number of individuals enlisted on the Union side during the Civil War was a little short of two millions and a quarter (2,213,365).

The number of soldiers and sailors pensioned on account of service during the Civil War was 1,156,160. Of this number, approximately 565,000, or nearly half, were pensioned on account of disability incurred during the war. The remainder were pensioned under various Acts of Congress which do not require that in order to obtain a pension the disability must have been incurred in service in "line of duty."[1]

A claim may be made by a soldier or sailor for a wound or injury received during the execution of his duty, or by accident, or on account of disability due to disease.

It would appear that all claims are referred to the Bureau of Pensions, which is under the direction of a Commissioner, who reports to the Secretary of the Interior.

The report of the Commissioner for the fiscal year ended June 30th, 1915, shows that the number of disability pensions in respect of the Civil War was 45,611, and the amount disbursed in pensions 16,500,000 dols. In 1911 the number of pensions was 113,469, and the amount disbursed nearly 32,000,000 dollars. The death-rate among pensioners, and among pensioned dependants also, is rising rapidly, as was to be expected, remembering that the war came to an end fifty years ago, but the immense time the liability of the State may continue in respect of war pensions is shown by the astonishing fact that in 1915 pensions were paid to 134 widows in respect of the war of 1812!

The report does not distinguish the nature of the disabilities in respect of which disability pensions are paid, so that the proportion of those given for wounds and for disease respectively cannot be calculated.

In settling the amount of a pension the Bureau acts on medical reports rendered by examining surgeons or boards of such surgeons appointed in every State, to the number of 4,554 altogether, including 550 "expert examining surgeons."

The amount of pension awarded is governed by an elaborate classification fixed partly by statute and partly by order of the Commissioner of Pensions.

"Disability equivalent to the ankylosis of a wrist" seems to be taken as a kind of base line, and the pension to an enlisted man for that is 8 dols. a month, or a little over 1s. a day. For the same disability the rates for army officers are for a second lieutenant 15 dols. a month, for a first lieutenant or assistant surgeon 17 dols., for a captain 20 dols., for a major or surgeon 25 dols., and for a lieutenant-colonel or officer of higher rank 30 dols.

The higher rates paid for more serious disabilities range from a maximum of 100 dols. a month for loss of both hands or both feet or of sight, to 55 dols. for the loss of a leg at the hip or an arm at the shoulder so as to prevent the use of an artificial apparatus, 40 dols. for the loss of one hand or one foot or total disability in one hand or one foot. The rate for ankylosis of the shoulder is 12 dols., for ankylosis of the elbow or knee 10 dols. The rates of pension in respect of the more serious injuries have shown a tendency steadily to increase. The rate for loss of both hands or of sight was originally only 25 dols.

It has often been alleged that politicians succeeded in abusing the pension law by means of special legislation in the interest of individuals. It would seem, however, that such abuses as were permitted to occur cannot have seriously affected the grand totals of the number of pensioners and the amount disbursed. Altogether 47,398 special pensions were granted by Acts of Congress, but most of the beneficiaries had been previously pensioned under general laws at lower rates. The number of these special pensions on the roll in 1915 was 21,648, with an annual face value of 6,500,000 dols. out of a total annual disbursement in pensions of 161,000,000 dols.

[1] "Line of duty" is a technical phrase, which is defined in the administration of the pension laws as that relation which a soldier or sailor sustains to the military or naval service of the United States when performing an act connected with any of the possible conditions or requirements of the service, or in the observance of the proper orders of his superiors, not in violation of the army or navy regulations.

THE WAR.

BEDS AND STRETCHERS.

(From a Correspondent in Northern France.)

THE BRADFORD FRAME.

THE Bradford frame mentioned several times with approval at the meeting at the Australian Hospital reported in the BRITISH MEDICAL JOURNAL of March 11th, p. 392, is a new introduction over here, but a familiar appliance in certain parts of the United States. It seems to have been in use in Boston for some twenty-five years, and bears the name of the medical man who devised it.

It is a kind of cross between a stretcher and a section mattress, resembling the former because a patient can

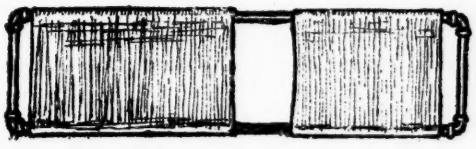

FIG. 1.—Bradford Frame.

easily be carried about on it, and the latter because he can lie on it for an unlimited period, any portion of his body being meantime accessible without disturbance of the rest.

Its construction is simple (Fig. 1): four pieces of iron piping about $\frac{7}{8}$ in. in diameter are clipped together by angle irons into an oblong frame, which is filled in by two strips of strong brown canvas. These strips pass over the lateral irons and round to the back, where they are tautened in the middle line by whipcord laces passed through brass eyelets. The whole apparatus weighs about 22 lb.; its dimensions when built for adult use are 76 in. long by 20 in. wide.

So far the description only suggests a stretcher devoid of handles or ground rests, and built of iron instead of wood; but the differences are of some importance. The lack of handles does not prevent the appliance being used like an ordinary stretcher, since the round corners of the frame afford a firm purchase for the hands of bearers, yet their absence, combined with that of ground rests, fits the appliance to be placed on a bedstead or the top of a mattress. Used thus it does not interfere with the comfort of the patient, yet enables him to be lifted off the bed and carried elsewhere at a moment's notice. The strips of canvas do not fill in the frame completely; there is a gap of some 9 in. between the lower edge of the one and the upper edge of the other. This gap occurs about the level of the patient's nates, so that by raising one end or the other of the frame a bedpan can readily be slipped into the desired position. This is the point which affords an analogy with a section mattress, and the resemblance is heightened by the movability of this gap (thanks to the lacing) and the possibility of making an additional gap by subdivision of either strip at any desired point.

This stretcher bed is regarded by those familiar with it as offering great advantages in dealing with all classes of injury, but especially those of the spine. It is also pointed out that the extension of an upper or lower limb can be secured by fixing it to the foot end and counter-extending by a perineal or shoulder band attached to the head end of the iron frame.

THE BRYAN BED.

Another apparatus mentioned at the meeting which may have been unfamiliar to some readers was the Bryan bed, devised by Captain C. W. G. Bryan, R.A.M.C., and described by him in the *Lancet* of January 1st, 1916. We are indebted to the editor of that journal for permission to reproduce two sketches by which the description was illustrated. The bed, our correspondent points out, affords a means of repeatedly dressing a severely septic compound fracture of the femur close to the hip-joint, and of attending to the nursing requirements of the patient without the degree of immobilization of parts previously obtained being in any way disturbed. It may be described as a bold extension of the Hodgett thigh splint. The latter among other things provides for the thigh a moulded bed formed out of strips of flannel attached to a rigid wire frame running parallel with the limb but a few inches distant from it; the Bryan bed does much the same for the whole body.

Like the Hodgett, it consists of a series of slings which, if their length is duly adjusted, precisely follow the natural contour of the supported parts. In the Bryan bed the slings are attached not to a wire frame suspended from the ceiling or elsewhere, but to two sloping wooden rails standing side by side on their own feet at a distance of about 3 ft. apart (Fig. 2). These rails are kept

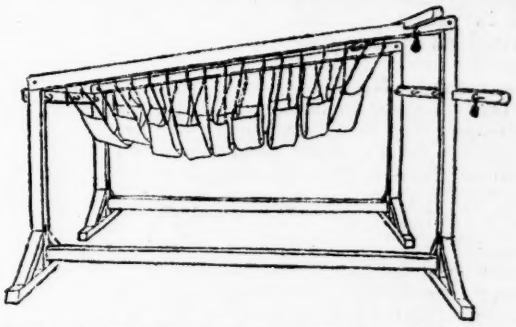

FIG. 2.—Bryan Bed, showing the flannel bands attached by chains to the wooden frame.

together by three bars, of which the two at the foot end are prolonged laterally so as to supply *points d'appui* for an extension pulley. This acts through two stirrups—one attached to the thigh, one to the leg—but only one weight is required to exercise traction on both of them because the pulley attached to the upper or thigh stirrup passes through a roller on the lower or leg stirrup. As the slope of the rails is downwards towards the head, the slope of the patient's body supplies the necessary counter extension.

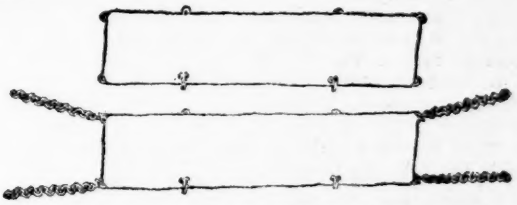

FIG. 3.—Five-fold flannel bands, with rings at the corners and hooks and eyes at the sides (Bryan Bed).

The supporting bands of slings are made of fourfold strips of flannel (Fig. 3) attached to one another by hooks and eyes and to the rails by curtain rings and short lengths of steel chain; so by using one link or another the slings can be precisely adjusted to the patient's body and limbs. Similarly, any one of them can be removed altogether when it is desired to gain access to the overlying part or to release it from pressure. A folded blanket is also slung from the rails, and with the addition of any superimposed blankets can be brought close up to the patient's body so as to keep him warm, or be lowered a few inches so as to provide a support for any nursing utensil or dressing receptacle that may be in use. The wooden framework is sufficiently solid to allow of the whole apparatus—including the patient—being moved from one place in the ward to another if required.

There are many other ingenious points about this appliance which seem to be found comfortable by patients, and certainly meets the direct aim in view. It does not of course render the patient transportable, and though it is not really as complicated an appliance as the description of it might perhaps suggest, full advantage of the possibilities that it offers is not likely to be secured by a surgeon or nurse unendowed with a natural aptitude for mechanics.

[A device designed on the same or a very nearly similar principle for keeping up traction on the soft parts of an amputation stump is described by Captain Bryan in our columns this week (p. 480).]

STRETCHERS.

The wheeled stretcher-bearer mentioned by a battalion medical officer was probably the regulation pattern for

appliances of this order—a couple of rubber-tyred steel-spoked bicycle wheels joined by an axle fitted with double elliptic springs on which rests a seating of suitable dimensions for a regulation stretcher. There are also hinged legs which keep the seating level and the wheels from rolling when the carrier is not being held.

But it is not the only pattern in use. The R.A.M.C. has never lacked men with an instinct for mechanics, and such men now are especially common. This is a mechanical age, and among those who have joined the R.A.M.C. for the duration of the war or belong to its territorial units are not a few men who have served their time in "shops" of a more or less engineering order.

The idea of saving labour by providing a hand-pushed stretcher carrier is in itself quite old. The hand-carts so common in Northern Europe seem to have been used largely by Larrey in dealing with the wounded in some of the later Napoleonic campaigns, and stretcher carriers—as distinct from wheeled stretchers, and of a kind closely allied to those used in the army—are to be seen in some civil hospitals built in separate blocks. But in war they have their limitations. They are not fit for work on really rough ground; they are not easy to carry about from place to place ready for instant use; and unless their supports come automatically into action when required, a patient may be thrown off the stretcher should the orderly who is pushing the vehicle stumble badly or fall. Attempts have been made, with more or less success, to eliminate the second drawback by hingeing the axle so as to allow of several carriers being placed inside an ambulance, and the third can be lessened by telling off two orderlies to each carrier. Still, even if they were free from all drawbacks, their use would often be superfluous. In several parts of the front the trolley lines laid by the engineers to facilitate the bringing up of supplies can be used equally well for sending back the wounded.

But it is very much less in the direction of stretcher carriers than of stretchers themselves that activity of thought is manifest in front-line areas. As a general utility appliance the regulation stretcher would be hard to beat, but it was designed and perfected when no one dreamed of a war mainly consisting of trench fighting. It can be lowered into a trench and used to lift a wounded man out over the back parapet or parados, but for moving him about inside the trench it is almost useless. It is true that it can usually be got along a communication trench, but between that trench and the fire trenches and in the latter there are corners that cannot be negotiated by anything the length of a stretcher. The difficulty is easy to realize when it is remembered that the usual outline of a trench is very much that of a series of capital U's standing at varying distances apart but united by lines at their tops.

The attempts that have been made to meet the difficulty vary a good deal, but the resulting stretchers fall, roughly speaking, into two groups. In the one the stretcher is no longer a stretcher, but a kind of carrying chair; in the other it is a very narrow vehicle something like a flat-topped wheelbarrow, the handle end of which can be raised into the air. The patient does not fall off because half way down is a kind of saddle or perineal crutch, and at the upper end a shoulder strap. Some of these appliances have obtained a certain measure of success, but usually this has been quite local. The reason is that in point of breadth, depth, and flooring, the trenches, owing to inevitable circumstances, vary all along the line. Consequently, a stretcher contrivance which may just pass muster, or even prove excellent in one series of trenches, may be useless elsewhere.

MEDICAL DISEASES IN THE MEDITERRANEAN WAR AREA.

A slim volume of *Memoranda on Some Medical Diseases in the Mediterranean War Area* has been issued by the War Office.[1] It contains short articles on various diseases, and some sanitary notes, including hints on camp sanitation illustrated by drawings and sectional diagrams to scale, designed to furnish information likely to be useful to medical officers who have not had much experience in military sanitation under semi-tropical conditions. Special attention is directed to flies in connexion with the disposal of excreta, and the necessity for strict discipline is insisted upon. Incidentally it is mentioned that 4,000 flies can emerge from one-sixth of a cubic foot of sewage trench ground, and 500 from a single deposit of human faeces. Directions are given for incineration and for the disposal of refuse and sullage. In discussing the destruction of vermin, an illustration is given of a French modification of the barrel disinfector, which is stated to be very effective; sulphur fumes are deadly to lice, and in this apparatus fifteen men's costumes can be exposed to them at a time.

The diseases discussed include diarrhoea, dysentery, and hepatic abscess; the various forms of dysentery are discussed at some length with illustrations to assist in the microscopic examination of stools. In speaking of the differential diagnosis in connexion with bacillary dysentery, the observation is made that bilharzial dysentery must be borne in mind, and in the more chronic cases the possibility of tubercle, cancer, and syphilis. Among the other diseases the etiology and treatment of which are described are cerebro-spinal fever, which, it is stated, has occurred at Salonika within recent years, jaundice, oriental sore, and paratyphoid, phlebotomus, relapsing, typhus, and undulant fevers. A characteristic drawing is given of *Phlebotomus papatasii*, and in the section on malaria there is a plate showing the life-cycles of malarial parasites, illustrating the correspondence between the temperature variations and the stages of development.

In a section on insect pests, which are roughly classified into the wingless and the winged, illustrations are given of *Anopheles* and *Stegomyia*, and also of the sandfly, which, it is said, is likely to be met with during the spring and summer in the Balkans. There is also a striking illustration of the larva and pupa of both *Culex* and *Anopheles* shown in characteristic attitudes with their eggs. Several methods of destruction of clothes-lice are mentioned, the first place being given to the use of a suitable sterilizer, the second to sulphur fumigation, and the third to spraying with petrol, paraffin, benzine, or 10 per cent. formalin, or with the steam jet from a kettle. Menthol is mentioned as the chief constituent of powders which have been used with success for sprinkling over the body and clothes. Two prescriptions are given: one of these is menthol gr. 5–10, zinci ox. ad ʒj; in the other some pyrethrum and talc are added. An ointment consisting of guaiacol and vaseline is also said to be useful for rubbing into the skin.

There is a note on cholera, of which it is said that though no cases have been reported in the Mediterranean Expeditionary Force, yet with the advent of warm weather and the extension of the campaign to Bulgaria it is more than likely that it may occur in the war area. Of plague it is said that the aggregation of ships in Eastern Mediterranean ports, the movement of Turkish and Russian troops from east to west, and the proximity to Egypt may cause it to make its appearance in the war area. Its etiology, its various types, its diagnosis and prophylaxis, are discussed. A drawing is given of the rat-flea, and also of the black rat, which, as well as the grey rat, suffers from plague. The grey rat is the usual ship rat, but the black rat is said to be the more dangerous as it lives in closer association with man. We commend the introduction of the notes upon these two epidemic diseases, because the book, it is to be expected, will be an indispensable part of the kit of every medical officer serving in the Mediterranean area; and however sanguine our hope that neither disease may attack the British forces, it will be at the moment when a suspicion first arises that the need for an authoritative statement will be most felt, and then it may very well happen that the medical officer concerned may not be able immediately to obtain either clinical or bacteriological consultation.

[1] His Majesty's Stationery Office. To be obtained through any bookseller. Price 1s.

THE R.A.M.C. AT WORK IN NORTHERN FRANCE.

Dr. Grenfell of Labrador, who has been serving in France with the Harvard surgical unit, contributed to the *Times* last week an article on the work of the R.A.M.C., in which he paid a very high compliment to its organization. He gave a succinct account of the sanitary work, the development of which has been described by our

correspondent in Northern France from time to time during the last eighteen months.

When the British took over the trenches west of Ypres, where typhoid was endemic in the villages, our allies, Dr. Grenfell says, had nearly 6,000 cases of the disease. Now, he says:

Typhoid is so small a factor that if a single case occurs anywhere in four armies it is known the same night at head quarters, and next day a rigid local inquiry is held as to the cause. Tetanus, a most terrible and fatal danger of mud associated with wounds, is being met with inoculation so soon after the event that it, too, has become an almost negligible factor in mortality. Trench-feet at first disabled thousands of our soldiers. To-day it is no longer a problem. A batch of such cases is now sent down by the medical officer in the trench with an apology and an explanation, as if it were a misdemeanour. When reference was made at head quarters to a group of 150 cases we had seen a week before coming from a section under deep snow, the Chief of Staff instantly said: "Ah, but that couldn't be helped. There was such heavy 'strafing' for two days there that the men hadn't a chance to change their boots even." It was an act of God, assisted by the Boche. The feet of one of the prisoners brought in at the same time were gangrenous.

Of the arrangements for the prompt treatment of serious wounds he says:

Hospital accommodation is provided, and trained nurses and specially selected surgeons are working, so near the trenches that many abdominal and thoracic wounds are in the operating room in two to three hours—one man was brought in just fifty-five minutes after he had been injured. It is only when one considers how long it takes in London, and also the difficulty of removing any man from the trenches in daylight (so that red crosses on white bands are largely abandoned by stretcher bearers as being rather objects to attract attention of gun-fire than to avoid it), the terrible condition of the shell-torn roads, and the hopeless mud of the sodden country, that the real significance of these magnificent results becomes apparent.

Speaking of the organization for treating wounded, he says that he has heard criticisms on the one hand that operations are entrusted to incompetent hands, and on the other that extravagant salaries are paid for illustrious names.

Neither of these statements (he says) have any truth in them. Unfit surgeons are remorselessly eliminated as soon as recognized, and the army has not paid more than the rank entitles him to for any surgeon. Yet they have permanently in France men whose skill brings them in the comfort of their own homes ten times the money for which they are serving the empire.

To us, the team work of these hospital units, each with its expert in various lines, the pathologists, the *x*-ray men, the diagnosticians, the therapeutists, the operating surgeons, and the commanding executive medical officer, suggest an ideal model for the future in civil life. The splendid special dental and eye clinics that have also come into existence are among the best evidences of progress and evolution of the R.A.M.C. in France.

Speaking of wounds of the abdomen, chest, or head, he says that the ideal would be to build a hospital over where the man fell, but adds that at least one field ambulance, so close to the line that the jolting of transport by motor car can be eliminated, has already become a special hospital, although it had to be moved back from its first place to a better shelter a few hundred yards away, because a shell came through the roof. He describes the regimental dressing station as a strongly protected dug-out, and says that the advanced dressing station is often also a dug-out. With reference to the field ambulance head quarters he says that critics forget that nearness and accessibility are far from being synonymous. The clearing stations he describes as economic sieves; rest camps have been added to them, at one of which as many as 80 per cent. are saved altogether the journey to the base and the long absence from their regiment such a journey involves. He mentions the repairing shops, and says that "mobility is preserved by this strict economy, progress is guaranteed by the encouragement which the head quarters staff gives to suggestions, efficiency by the unselfish spirit animating the doctors, nurses, and orderlies."

Dr. Grenfell concludes his article in the following words: "No profession is altogether exempt from self-seekers, disappointed men, incompetent men. Wilfully or otherwise, these men will present false impressions of any service, however noble and efficient it may be, but the British public has no reason to be anxious for their friends in the hands of the R.A.M.C.".

GERMAN EXPERIENCES.

MEDICAL PROBLEMS IN WAR.

IN a paper read before the Medical Society of Berlin[1] Dr. Goldscheider, consulting physician with a German army, said that the arrangements made in time of peace for the transport of the sick, as distinguished from the wounded, had proved totally inadequate. The underlying principles affecting the removal of the sick were not recognized, and every physician was left to work out a scheme of his own. Many patients suffering from heart disease, nephritis, pleurisy, etc., who succumbed to the hardships of transport could not have been expected to stand even the luxurious travelling of peace time.

Typhoid Fever.

The fate of a patient with typhoid fever was often determined by the decision for or against moving him. When the transport of these cases was inevitable it was advisable to give digitalis, but whenever it was possible, no patient suffering from typhoid fever should be moved before the end of the third week.

If bacteriology was to be of real value in the early diagnosis of typhoid fever, the bacteriologists would have to be stationed much nearer the front than had hitherto usually been the case. In the overwhelming majority of cases the diagnosis of typhoid fever was made independently of bacteriological methods. In clinically atypical cases a bacteriological examination was often indecisive, or was not decisive till the diagnosis could easily be made by other means. The war had shown that the German medical man was insufficiently equipped in the technique of examination and diagnosis, and steps would have to be taken to bridge more effectively the gap between theory and practice. He had found that the subjects of typhoid fever were often treated on the lines of blunderbuss pharmacy. Calomel, opium, quinine, aspirin, pyramidon, digitalis, and caffeine were poured into the patient. Personally he relied exclusively on cardiac remedies and small doses of pyramidon, but he did not approve the systematic administration of large doses of this drug over a period of weeks. The exaggerated claims made on its behalf had led many German physicians to regard it as a specific for typhoid fever. Dyspepsia, nausea, pneumonia, and cardiac weakness were, in his opinion, contraindications. He was not yet sure of the effect of vaccine-therapy, though under certain conditions it was beneficial, and deserved further study. The mortality from typhoid fever varied considerably in the different German armies, owing largely to the varying severity of the disease, the conditions under which transport of the sick was effected, and the facilities for obtaining proper food. The influence of these factors was so great that the mortality statistics in the various armies were no satisfactory guide to the merits of the respective methods of treatment.

Other Infectious Diseases.

At one point on the west front a large crop of cases of Weil's disease developed; its origin was obscure. The conditions under which epidemics and single cases of cerebro-spinal meningitis occurred were also obscure. Trauma and exposure to cold certainly played an important part, and in one case fracture of the base of the skull was followed in a week by symptoms of meningitis, and the meningococcus was found in the throat and cerebro-spinal fluid. Little was seen of febrile articular rheumatism in the winter; but it was relatively frequent in the spring and summer. Most of the patients suffering from muscular and articular rheumatism had already showed signs of these conditions before the war.

Heart Disease.

The frequency of symptoms referable to the heart was surprisingly great, and had increased since the development of trench warfare. They were due to muscular and nervous exhaustion, and of the two the nervous element was the more important. In many patients there were predisposing factors, including faulty development, anaemia, and neurasthenia. Many had previously suffered from nervous palpitation, while others had not been able to stand the change from a sedentary occupation to the

[1] *Berliner klinische Wochenschrift*, November 1st and 8th, 1915.

strenuous life of a soldier. Among the older classes alcohol and early arterio-sclerosis no doubt also played a part. Dr. Goldscheider distinguished three classes of heart cases: (1) Cardiac neurosis associated with general weakness, slight dilatation of the heart, an abnormally low blood pressure, cyanosis, coldness of the limbs, increased frequency of the pulse on slight movement or change of position, and irregular, weak action of the heart; (2) cases in which the symptoms were nervous only and there was no muscular weakness of the heart itself or of the body generally, but often evidence of general nervousness; (3) a large group of cases in which tachycardia was the main or only symptom. The symptoms due to over-exertion were transitory. In all three classes adventitious murmurs and muffling of the first sound were frequently observed.

Dr. Goldscheider deplored the lack of a simple functional test applicable to all these cases; the reaction to graduated exercises was a useful guide, but it often failed to distinguish between the muscular and nervous factors, which, in fact, were often so closely combined that it was wiser to use the term "functional cardiac disturbance" than "nervous or muscular disturbance." The patients in the last two classes often recovered quickly, and even in the second class many were again fit for garrison or even for active service. But some patients were no better after nine months, and the most difficult to cure were the many subjects of neurasthenia in whom cardiac and vasomotor neuroses had existed before the war. The mental factor was of enormous importance, and on this account it was considered unwise to keep the patients in hospitals or sanatoriums for long. For the same reason the slight cases were not sent home, but were employed on light work on the lines of communication. It was also found advisable to distract the patient's attention from his heart, and to treat him only for general exhaustion. When discharged from hospital, many of these patients recovered quickly.

A correct estimate of the condition of the heart of recruits or soldiers required time as well as skill. Modern methods of diagnosis had largely replaced such a simple method as percussion, yet for quick work this was indispensable. The younger generation of medical men had learnt to trust so much to the diagnosis of aneurysm of the aorta by the *x* rays that they had neglected the simpler tests of sight and touch. The most frequent error was the failure to distinguish between accidental and organic murmurs and arterio-sclerotic myocarditis from cardiac neurosis. In fact, the war had brought into unflattering prominence the ignorance of the medical profession of a group of symptoms with which a very large proportion of the soldiers in the German army were invalided.

BRONCHITIS AND MALINGERING.

During his work as an army physician F. Hamburger (*Der Militärarzt*, August 28th, 1915) often detected soldiers simulating bronchitis. In such cases, when the patient is told to breathe deeply, expiration is laboured and prolonged, and is accompanied by rhonchi and sibili, audible over the whole of the chest. Inspiration, on the other hand, sounds perfectly normal. When, however, the patient is told not to breathe through his mouth but only through his nose, these adventitious sounds become less loud and numerous, although they do not completely disappear. When the patient is told to breathe quietly, but deeply, the respiratory sounds are unaltered, and the patient declares that he cannot possibly breathe in any other way. In these circumstances the physician who is off his guard is apt to diagnose diffuse bronchitis, with or without emphysema. These signs are intentionally produced in the throat and transmitted to the whole of the chest. The laboured and prolonged expiration is due to the voluntary and almost complete closure of the glottis, and the effort required to overcome this obstruction calls into play all the muscles of expiration, and it is to the contraction of these muscles that some of the adventitious sounds heard on expiration must be traced. When the malingerer takes deep breaths these signs are present, and when his breathing is shallow, they cannot be heard. To distinguish between true, dry, diffuse bronchitis and the fictitious bronchitis of the malingerer, the patient is told to stop breathing, but the stethoscope is kept on the chest. When the suspect can no longer hold his breath, but thinks that he is still expected to do so, his expiration, if he is a malingerer, is perfectly normal. As soon as he is told to breathe deeply again the signs of bronchitis recur. In some cases the patient is guiltless of deliberate malingering, his faulty expiration and consequent simulation of bronchitis being an unconscious act. Owing to the conduction of sounds from the throat and trachea to the chest, catarrh of the throat and trachea facilitates the simulation of true bronchitis.

CASUALTIES IN THE MEDICAL SERVICES.

ROYAL NAVY.

Prisoners of War.

THE Admiralty announce that the majority of the officers and crew of H.M.S. *Tara*, who were prisoners of war with the forces of the Senussi, on the western frontier of Egypt, were rescued after the recent attack on the Senussi's camp. Ten officers were rescued, including the medical officer of the ship, Surgeon Probationer John D. Arthur, R.N.V.R., and eighty-one men. One engineer lieutenant died in captivity.

ARMY.

Killed in Action.

Captain Ronald Wingrave Duncan, R.A.M.C., was reported as killed in Mesopotamia, in the casualty list published on March 23rd. He was educated in the Medical School of the Royal College of Surgeons, Edinburgh, took the L.D.S. of that college in 1906, and the Scottish triple qualification in 1907. He received a temporary commission as lieutenant on November 24th, 1914, and was promoted to captain on completion of a year's service. He was attached to the second battalion of the Leicestershire Regiment.

Assistant Surgeon Arthur Charles Marchant, Bengal Subordinate Medical Department, was reported as killed in East Africa, in the casualty list published on March 23rd. He was born on November 9th, 1885, attained warrant rank on March 4th, 1907, and was promoted to the third class on March 4th, 1912. Before the war he was serving at Magadi, in British East Africa.

We regretted to announce last week the death of Captain John Wilson, R.A.M.C. In the casualty list he was described as lieutenant, but we understand that he had been promoted to captain. We are informed that the Commanding Officer in communicating the sad news to the relatives wrote:

> A message came to our medical aid post that several men were wounded in our centre trench. Captain Wilson at once volunteered to go to their assistance, although it was necessary to cross absolutely open ground swept by the fire of the hostile trenches to do so; owing to heavy shell fire all our wires were broken. However, he reached the trench, bandaged up those who required it most, and was on his way back to the shelter of the quarries, when the Germans in the front fire trench opened fire on him and a bullet struck him just about the heart. I think his death was almost painless, and it was all over in a few minutes. Captain Wilson by his energy and devotion to duty had earned the appreciation of every officer and man in the battalion; it is only ten days since I had the pleasure of recommending him for the Military Cross. He did not know what fear was, and was ready at any moment of the day or night to turn out and give assistance to the sick or wounded.

Wounded.

Lieutenant-Colonel E. A. Wraith, R.A.M.C.(T.F.), France.
Captain G. B. Ferguson, R.A.M.C. (temporary), France.
Lieutenant J. P. Musson, R.A.M.C. (temporary), France.

Died on Service.

Captain George Flett Barr, R.A.M.C., died recently in France. He was the eldest son of the late James Barr, of Thornley, Park Terrace, Paisley, was educated at Glasgow University, where he took the degrees of M.B. and Ch.B. in 1914. He received a temporary commission as lieutenant on January 22nd, 1915, and was promoted to captain on completion of a year's service.

Colonel James Harper, R.A.M.C.(T.F.), died at 25, Rosary Gardens, South Kensington, on March 25th, aged 58. He was educated at St. Bartholomew's Hospital, where he was Brackenburg scholar in surgery in 1881, and took the diploma of M.R.C.S. and the degree of M.B.Lond. with honours in obstetric medicine in 1881. He graduated M.D. in 1883. He was house-surgeon at St. Bartholomew's, house-physician at the Royal Hospital for Diseases of the

Chest, and resident medical officer and anaesthetist of the Chelsea Hospital for Women. He practised for many years in South Kensington. He was Assistant Director of Medical Services of the 1st London Division (T.F.), a member of the City of London Territorial Force Association, Esquire of the Order of St. John of Jerusalem, a member of the Order of Mercy, and a Fellow of the Royal Society of Medicine. He also held the Territorial Decoration.

Captain Robert Francis Hebbert, I.M.S., medical officer of the 107th Pioneers, died in Mesopotamia of relapsing fever on March 19th, aged 33. He was born on March 7th, 1883, the only son of the late Francis H. Hebbert, Indian Civil Service, and was educated at St. Thomas's, taking the M.R.C.S. and L.R.C.P.Lond. in 1906. He entered the army as lieutenant on September 1st, 1906, and was promoted to captain on October 4th, 1909.

Deaths among Sons of Medical Men.

Birdwood, Herbert Frederick, Lieutenant 20th Battalion London Regiment, only son of Dr. Roger A. Birdwood, late medical superintendent Park Hospital, Hither Green, London, S.E., killed in France in an air fight over Valenciennes on March 2nd, aged 22. He was educated at the City of London School, and in 1913 entered Peterhouse College, Cambridge, where he was reading law. He took a commission in the 20th (Blackheath and Woolwich) Battalion of the London Regiment on August 26th, 1914; went to the front in March, 1915; was in the battle of Loos last September, and joined the Royal Flying Corps in December.

Captain John Arthur Graham, 7th Battalion Lincolnshire Regiment, youngest son of the late Brigade-Surgeon H. W. Graham, I.M.S., killed in France on March 20th, aged 40. He was educated at the United Service College, Westward Ho, and at Heidelberg, and was a planter in Coorg, South India. He served as a trooper in Lumsden's Horse in the South African war, gaining the Distinguished Conduct Medal and the Queen's medal with three clasps. He was for many years a member of the Coorg and Mysore Rifles (Volunteers), in which he became second lieutenant on March 6th, 1906, and lieutenant on May 1st, 1907, and held the Long Service Decoration. Coming to England for the war, he got a commission in the Lincolns on April 1st, 1915; went to France in July; was mentioned in dispatches on January 1st, 1916; and received the Military Cross on January 15th.

Morris, Colin Dwight, Second Lieutenant 9th Battalion Royal Fusiliers, only son of Dr. Dwight Morris of Parkside, Feltham, Middlesex, killed in France, on March 14th, aged 27.

Smith, Gilbert Keppel, Second Lieutenant 5th Reserve Battalion Middlesex Regiment, younger son of Dr. Harry Smith of Paddock House, Chatham, killed in France on March 13th, aged 25. His commission was dated March 20th, 1915.

Medical Student.

Goodfellow, E. H., Lieutenant Royal Field Artillery, killed in France on March 8th. He was born and educated in New Zealand, and entered Edinburgh University as a medical student in 1913, aged 21. In his first year he gained five class medals and a Vans Dunlop scholarship. On the outbreak of the war he enlisted in the R.A.M.C., in which he became corporal. He got a commission in the Royal Field Artillery on December 8th, 1914; went to France in February, 1915; was promoted lieutenant last autumn, and was wounded in September.

Nurses.

Dame Lucy Innes Branfoot died at No. 8 General Hospital, Rouen, on March 16th, aged 52. She was the widow of the late Surgeon-General Sir Arthur Branfoot, K.C.I.E., of the Madras Medical Service, President of the India Office Medical Board from 1903 to 1911.

Miss Jeanie Glassford Dalton, Queen Alexandra's Imperial Military Nursing Service, died at the Royal Herbert Hospital, Woolwich, on March 20th. She was the daughter of the late Joseph J. Dalton, of Kamer, Kyles of Bute.

Correction.—In recording the death of Lieutenant Neil Murphy Gavin last week his surname was accidentally misplaced.

NOTES.

Austro-Hungarian Casualties.

The *Morning Post* recently published in a letter from its correspondent in Budapest some statistics obtained from a Hungarian statistician showing that neither Russia nor Germany has lost so many men as Austria-Hungary during the war. The figures are founded on the 320 official lists of casualties, the reports of unit commanders, monthly reports of hospitals, and other documents. It is stated that the losses during the first year of the war amounted to over 3,000,000, not including 200,000 who died of disease. It is also mentioned that the figures include the wounded who have returned to the front, in some cases two and three times; and, further, that the number of wounded can be discounted by nearly 60 per cent., as the cases of total disablement were no more than 15 per cent., while 20 to 25 per cent. who were unfit for service were fit for light or civilian duties. The figures for the three main fronts come down to February 15th or 1st, 1916. Certain casualties in Belgium, where some Hungarian hussar and artillery regiments served in 1914, are added.

Eastern Theatre.

	Killed.	Sick and Wounded.	Prisoners.
To January 1st, 1915	124,300	500,900	110,000
To August 1st, 1915	307,500	1,240,600	470,000
To February 15th, 1916	108,500	370,000	68,000
Total	540,300	2,111,500	648,000

S.E. Theatre (Balkans).

	Killed.	Wounded.	Prisoners.
To January 1st, 1915	47,500	90,000	78,000
To August 1st, 1915	2,900	5,900	—
To February 1st, 1916	67,500	170.000	2,000
Total	117,900	265,900	80,000

S.W. Theatre (Italy).

	Killed.	Sick and Wounded.	Prisoners.
To August 1st, 1915	17,200	73,700	13,500
To February 1st, 1916	46,500	145,000	17,000
Total	63,700	218,700	30,500

Western Theatre (Belgium).

	Killed.	Sick and Wounded.	Prisoners.
To January 1st, 1915	1,600	4,000	600
Grand total	723,500	2,600,100	759,100

French Wounded from Verdun.

We understand that the British Red Cross sent some fifty ambulance cars to assist in the evacuation of the wounded from the Verdun district. This convoy supplements the unit of twenty-five cars which has been working with the French troops for a year or more. When the German attacks on Verdun began the French found it necessary to transfer the wounded from the hospital to the cellars of the Archbishop's house. Later on they were all moved to Bas le Duc and hospitals further in the rear. The manner in which the evacuation was carried out has been commended in dispatches.

Medical Officers Wanted.

3/2nd East Anglian Field Ambulance.

Medical officer required for this unit, possibly going overseas. Pay and allowances as in regulars. Applications to the Officer Commanding, Halton Park, Tring.

2/1st Highland Mounted Brigade Field Ambulance.

Three medical officers are required to complete establishment of the 2/1st H.M.B. Field Ambulance. Also regimental medical officer for the 2/2nd Lovat Scouts. Applications to Major Mowat, Officer Commanding, 49, Northgate, Beccles, Suffolk.

2/1st North Midland Field Ambulance.

Two or three medical officers are required for this unit to complete establishment for service overseas. Apply Lieutenant-Colonel Dawson, Officer Commanding, Harpenden.

Scotland.

A conscientious objector of the most pronounced kind was disclosed at a meeting at Oban of the tribunal for the Lorn district in the person of the assistant county medical officer and tuberculosis medical officer. According to a report quoted from the *Oban Times* in the *Edinburgh Evening News* the applicant, believing war to be morally wrong and indefensible, was determined to have absolutely nothing to do with it, either as a combatant or non-combatant, and was unwilling to serve in the R.A.M.C. The tribunal refused the application.

Crippled and Maimed Soldiers and Sailors.

A meeting of the committee of the hospital proposed to be established in the West of Scotland for soldiers and sailors who have lost limbs in the war was held in the City Chambers, Glasgow, on March 23rd. The Lord Provost said that the arrangement mentioned in the Journal of March 11th (p. 395) had been confirmed by the military authorities. The hospital will be quite independent of the Queen Mary Auxiliary Hospital at Roehampton, and will receive the same recognition and privileges from the military authorities. It will be available for all Scottish cases sent to it by the authorities, and the committee is making arrangements for an adequate supply of artificial limbs to be manufactured in Scotland. A suitable house in the

vicinity of Glasgow has been secured. Several substantial contributions towards the fund for the equipment of the hospital have been received, including two of £1,000 each.

NEONATAL MORTALITY IN EDINBURGH.

On March 25th Dr. J. W. Ballantyne gave an address on neonatal mortality to the voluntary health visitors in the Council Chambers, Edinburgh. He first contrasted the health conditions of Edinburgh in 1913 and in 1915. The marriages in 1915 had risen by about a thousand, but various causes had doubtless been at work, and no deductions could safely be made. On the other hand, the number of births in 1915 had decreased by about 400, bringing the birth-rate down to the unprecedented level of 17.8; it was a dangerous level, too, for the number of deaths had risen by about 800, giving a death-rate of 16.4. The natural increase of the population in the year 1915, therefore, was only 432, and since the deaths of Edinburgh soldiers at the war were not included, it probably meant that there was no increase at all in the number of persons in the city. The increase in the death-rate, further, was not due, as so often in the past, to a sudden zymotic rise in childhood, but seemed to affect all ages and to have many causes. At the same time the infantile mortality had risen, for 774 babies died in the first year of life in 1915 (an infantile rate of 132 per 1,000), as against 631 in 1913 (101 per 1,000). It was a striking fact that one-seventh of all the deaths which had occurred had been in the first year of life. Just as the first year's deaths were more numerous than those of any succeeding year, so those of the first month of that year were more numerous than those of any succeeding month, and those of the first week than of any succeeding week. The deaths in the first month constituted a third of those of the entire year (257 out of 774). Dr. Ballantyne thought that deaths at this period ought to be considered by themselves in all vital statistics, under the name of the neonatal death-rate. If the neonatal rate had persisted in Edinburgh during the whole of the first year of life there would have been in 1915 not 774 deaths but 3,086, and if the rate in the first week (when 155 perished) had been continued in the other fifty-one weeks, the total infantile deaths for the year would have been 8,060 instead of 774. To look at the matter from the opposite side. If the deaths in the first month had been at the same rate as in the other months, not 257 but only 47 lives would have been lost in that first month, whilst if the rate in the first week had been as the average of the remaining weeks only 12 instead of 155 would have died in that week. The neonatal deaths, therefore, represented death's most successful "thrust" against young life; and the conditions under the war seemed to have made this thrust more successful, for if the 1913 rate had been maintained in 1915 a smaller number than 257 would have been lost. It had at the same time to be recognized that the war conditions had not apparently so marked an effect upon the deaths in the first as upon those in the later months.

The lesson to be learnt was that the health visitors ought to concentrate their attention specially upon the first month of life. They need not, however, as a rule, pay much attention to the first ten days, for during that time the doctor or midwife was in attendance, and presumably was watching over the young life; but after the doctor or midwife ceased attending—namely, in the last two-thirds of the first month—their help and advice would be most helpful in checking the fatalities among the babies. The Royal Maternity Hospital was trying to counteract some of the dangers by its weekly baby clinics for the children of women who had been confined in connexion with the indoor and outdoor departments, but there were still many neonatal lives in Edinburgh to be watched over and reported upon. Further, the health visitors ought to direct their visits chiefly to those parts of the city in which the neonatal death-rate was highest. There should be in the plan of campaign two concentrations therefore—one as to age and the other as to locality.

When the causes of the neonatal deaths were scrutinized and classified it became clear that by far the larger number were in action before birth. Above 60 per cent. were either wholly or partly antenatal in origin; indeed, careful analysis, with all the facts in view, would probably raise the percentage to 70. The obvious lesson was that no care would be sufficient to meet entirely the neonatal risks which did not take cognizance of the mother's health in her pregnancy. In order to conduct a successful neonatal campaign, the visitors would require to begin with the expectant mothers.

Correspondence.

THE SOLDIER'S HEART AND THE STRAINED HEART.

SIR,—In a letter in your columns on March 11th, p. 396, it is suggested that all cases of "irritable heart" among soldiers may possibly be classified under "tobacco heart" or the "strained heart" due to athletics in boyhood.

That all cases are not due to these causes is shown, I think, by the frequent occurrence of "irritable heart" among the Indian soldiers who have been in hospital in this country. Athletics, if practised at all by Indians in their boyhood, are not carried to the point of strain by the rural classes from which soldiers are drawn, while the use of tobacco in any form is forbidden by their religion to the Sikhs, who suffered in as great a proportion from "irritable heart" as the other races composing the Indian army.—I am, etc.,

R. D. MACGREGOR,
Captain I.M.S. (ret.).

London, W., March 14th.

THE PHYSICS OF A SURGICAL DRESSING.

SIR,—I cannot agree with the objections made to the use of wet dressings with oil-silk. If the gauze in contact with the septic wound is kept moist it absorbs a great deal of pus, which is partly disinfected by the antiseptic in the gauze, whereas with a dry dressing a little is absorbed and cakes, forming a natural impermeable covering, the wound itself being a perfect well of pus. In dealing with acute abscesses a wet dressing with oil-silk tends largely to prevent a secondary infection—a very important point.

Recently I have been using dilute Dakin's solution for treating septic wounds—cyanide gauze saturated with the solution and covered with jaconet. The results so far have been quite satisfactory.—I am, etc.,

OLIVER CARLYLE, F.R.C.S.Edin.,
Lieutenant R.A.M.C.

France, March 8th.

METRIC PRESCRIBING.

SIR,—There can be no disputing the fact that the metric system has come to stay, and as it has been adopted throughout the latest edition of the *British Pharmacopœia*, the sooner we give our attention to it the better, for that we shall have to do so sooner or later is inevitable. Some practitioners hesitate to put the new system into practice in prescribing, labouring under the impression that it would require a great deal of calculation, and so waste time. But this is a mistake. By the following mode of proceeding very little, if any, calculation is required. Say 7½ grains is the dose we wish to give; write it down as 7.50 *grams*, and we at once have sixteen doses (the gram being taken at its approximate equivalent), and we substitute metric for old measures at one stroke. The same with minims, bringing them to "mils" (or more correctly "millils"). We can then proceed to divide the amount, or multiply it, to any number of doses we wish to prescribe, and so adapt them to the sizes of bottles as at present manufactured. When the time arrives that metric bottles are made, we shall be as familiar with the new as with the old system. Where fractions or submultiples are concerned—as in pills—it necessitates greater exactitude. If the dose should happen to be $\frac{1}{75}$ the proceedings may be as above; but if not, I find the easiest way is to divide 0.65 (= one grain) by the denominator, thus: gr. $\frac{1}{5}$ = .013 (13 mg.), gr. $\frac{1}{80}$ = .00108 (108 c.mg.), and so on. And to prescribe ten pills we simply move the decimal point one place to the right, thus: .13 and .0108.

Metric measures or rules for sight-testing purposes may be obtained from the Decimal Association, Finsbury Court, Finsbury Pavement, E.C. It may interest your readers to know that this association is now engaged in preparing a scheme for the decimalization of our monetary system, taking the florin as the unit, and introducing two new coins of nickel with scalloped edges, of the value of 5 and 10 cents.—I am, etc.,

W. W. HARDWICKE, M.D.

London, S.W., March 18th.

MATERNITY AND CHILD WELFARE.

SIR,—On reading the commentary on the official scheme I was struck by the expression, "Educating the mothers"; what about educating the fathers? As a general medical practitioner I have found it very uphill work to get certain husbands to believe that the wife required rest. The primiparae, as a healthy class, do not require much care, whereas the multipara is beginning to feel that life is almost too much for her. The legs of some of these women are a disgrace to humanity. One sees them accidentally, and if as a sympathetic creature one advocates rest, the patient says, "It is all very well speaking, doctor; my husband thinks there should never be anything wrong with me."

From my past experience as a busy general practitioner (married and pregnant), attending to all medical duties during the first six months—midwifery cases included, with instrumental interference as well—I hold that to give every pregnant woman three months' freedom from worry and partial rest before her child is born, and three months after (if she nurses the child), would get rid of the weak infants that have no vitality to begin this life.

What a good time the cow and the mare have at this time! Are the mothers and children not of as much importance?

I rejoice in the National Insurance at present, as there is some assurance of rest (free from worry) for the pregnant woman. A patient of mine had been warned by her doctor to delay her marriage as she was too delicate; but at length she did marry. During her pregnancy she was in a very serious state, but with care and several months' rest, instead of chloroform and forceps as I had anticipated she would require, her child was born quite easily after she had been in labour for about eight hours. The baby was a good-sized, healthy child. I am quite sure that even with the best medical interference, *minus* the rest, she would not have lived through it, and certainly would not have brought forth a child such as she did.

Do not spend money on notifications, but let the women be the recipients of it.—I am, etc.,

Portobello, March 8th. MARGARET W. CAMERON.

Universities and Colleges.

UNIVERSITY OF DURHAM.

THE following candidates have been approved at the examination indicated:

THIRD M.B. (*Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence; Pathology and Elementary Bacteriology*).—P. V. Anderson, R. V. Brew, H. J. Dingle, D. Henegan, W. A. Howitson, C. G. Irwin, G. M. Kerry, J. K. R. Landells, S. A. Shehid, I. Soliman, H. I. Sterne-Howitt.

UNIVERSITY OF EDINBURGH.

THE following candidates have been approved at the examination indicated:

FINAL M.B. AND CH.B.—K. P. Brown, C. A. E. I. Brownlee, *A. J. Caird, B.Sc., Yun Yin Chan, F. W. Clark, C. T. I. Clarke, A. Cleland, J. A. Crawford, R. C. Crawfurd, H. J. Davidson, J. Dickson, *A. V. Dill, Tha Doe, W. H. Ferguson, G. H. Fraser, E. B. Gadmil, J. A. C. Guy, C. Harris, C. E. Hill, J. M. Johnstone, E. B. Kelley, J. B. P. M'Laren, J. Manuel, G. Morris, M. S. N. Panikkar, *D. H. Paterson, P. A. Rostant, J. J. Shannon, N. H. Smith, D. R. Thomas, A. F. de Waal, Gladys Ward, J. M. Watt, H. D. Wright.

* With distinction.

UNIVERSITY OF ST. ANDREWS.

THE following candidates have been approved at the examinations indicated:

SECOND M.B., CH.B. (*Physiology*).—J. M. Craig, C. B. Dyson, Janet M. MacMillan, Florence B. Mason, Phyllis Montford, W. G. Robertson, Gladys J. C. Russell, J. N. D. Smith, J. C. M'Gregor, N. MacVicar.

THIRD M.B., CH.B. (*Pathology*).—J. MacD. Clark, J. C. Coutts, J. Ferguson, J. C. M'Gregor, J. K. T. Mills, J. M. Orkney, G. R. Ross, G. R. Tudhope.

FIRST D.P.H. (*Bacteriology*).—E. E. Cassidy, D. M. M'Gillivray.

SOCIETY OF APOTHECARIES OF LONDON.

THE following candidates have been approved at the examinations indicated:

SURGERY.—*†M. Dwyer, *†J. Fox-Russell, *†H. M. Gray, *†R. Milne.
MEDICINE.—*M. Dwyer, *†E. N. Glover, *†R. Milne.
FORENSIC MEDICINE.—C. G. Bunn, M. Dwyer, E. N. Glover, R. Milne, R. H. Pettersson, J. M. Wall.
MIDWIFERY.—R. Milne, L. F. Pain, A. E. Pollitt.

* Section I. † Section II.

The diploma of the society has been granted to the following: J. Fox-Russell, H. M. Gray, and R. Milne.

Obituary.

STAMFORD FELCE, M.R.C.P.EDIN., M.R.C.S.ENG.

THIS veteran in the profession died at his residence at Burgess Hill, Sussex, on March 20th, in his 81st year. Dr. Felce was born in Huntingdon on October 7th, 1835, and received his medical education at St. Mary's Hospital. He took the diploma of M.R.C.S.Eng. in 1859, in which year he became resident medical officer at St. Mary's. In the following year he took the diploma of M.R.C.P.Edin. After holding the appointment of resident house-surgeon to the Western General Dispensary he commenced private practice in Launceston at the end of 1860, and became a member of the Cornwall Branch of the British Medical Association. In 1868 Dr. Felce returned to London, and became a member of the Metropolitan Counties Branch. He took up his residence in Paddington, where he remained until his retirement from practice in 1903. Members of the Association who were present at the annual meeting in 1896 held at Carlisle will remember how Mr. Lawson Tait suggested that a committee of inquiry should be appointed for the purpose of reporting on certain desired reforms. Dr. Felce took part in the discussion, and was made in October, 1896, a member of the Committee on the Constitution of the Association, of which the chairman was Dr. Robert Saundby, the treasurer Dr. C. Parsons, the other members, besides Dr. Felce, being Lord Ilkeston, Mr. Ward Cousins, Dr. Leonard Sedgwick, Dr. Markham Skerritt, Mr. Lawson Tait, Mr. Walter Whitehead, and Dr. Woodcock. Dr. Felce was very active in discharging other public duties connected with the profession. He was for many years honorary secretary of the Royal Medical Benevolent Fund, and became vice-president of that institution, as well as of St. Mary's Hospital and Epsom College. He was president of the Medical Defence Union, honorary secretary and treasurer to the Charles Bailey Charity (1890-1912), and member and chairman of the Paddington Board of Guardians. He was for many years a member of the Metropolitan Asylums Board, chairman of its North-Western Hospital (1885–1896), and chairman of the Darenth Asylum. Dr. Felce was instrumental in bringing about the building of St. Peter's Church, Paddington, of which he was a trustee and for seventeen years vicar's churchwarden. At the age of 71 he visited a son in India and at the age of 76 underwent amputation of the leg. Dr. Stamford Felce married in 1861, and his widow, three sons, and four daughters all survive him.

MARY CHARLOTTE MURDOCH, L.R.C.P., L.R.C.S.EDIN., L.F.P.S.GLASG.,

SENIOR PHYSICIAN, VICTORIA HOSPITAL FOR SICK CHILDREN, HULL.

DR. MURDOCH, the first woman to practise medicine in Hull, died at the age of 50, on March 20th, of an acute attack of influenza. She was the youngest daughter of Mr. William Murdoch, solicitor, of Elgin, and was educated at Edinburgh, Lausanne, and London. She studied at the London School of Medicine for Women, and was in 1892 curator of its museum. She took the Scottish triple diplomas, and in 1893 was appointed house-surgeon to the Victoria Hospital for Children, Hull. An attack of an illness, from which she had suffered when a student and which often recurred throughout her working life, brought about her resignation, but on convalescence she was selected medical officer to the North-East London Fever Hospital, South Tottenham. Dr. Murdoch often spoke in after-life of how much she owed to the chief medical officer, Dr. Birdwood, from whom she learnt much as to diagnosis and prognosis in acute infectious diseases, for skill in which she became well known. Meanwhile she was frequently urged to return to Hull, and in 1894 she set up in private practice there—a venture which met with immediate

success. In 1894 she was appointed honorary assistant physician and in 1897 senior physician to the Victoria Hospital.

Dr. Murdoch joined the British Medical Association in 1894, and was vice-president of the East York and North Lincoln Branch in 1909. She was also vice-president of the Association of Registered Medical Women. Dr. Murdoch took much interest in national, political, and philanthropic work of various kinds. She founded a local branch of the National Union of Women Suffrage Societies, of which she became president, only retiring when she undertook the presidency of the Hull branch of the National Union of Women Workers. She attended meetings of the International Council of Women at Toronto, the Hague, and Rome, at each of which she was one of the principal speakers. Dr. Murdoch, who was a vivacious and arresting speaker, took a lead in the purity campaign, and was an honorary medical officer of the Central Nursing Division of the St. John Ambulance, lecturing to the police force and to the North-Eastern railway men. In short, Dr. Murdoch was a very vigorous professional woman. Unfortunately she overtaxed her strength, and was greatly distressed because only a few weeks ago the infants' ward at the Victoria Hospital for Children had to be closed for lack of funds, and she had already, just before her decease, undertaken to raise £250, the sum necessary to reopen it.

A Requiem Mass was celebrated at St. Francis's, Hull, on March 24th, and later in the day thousands of the inhabitants of the city followed the funeral procession first to All Saints' Church, then to the Crematorium, and later to the deposition of the urn in the Lady Chapel of All Saints.

Alderman Thomas Underhill died at his residence in Bromwich on March 10th, just after celebrating his ninety-second birthday. Born in Tipton, Staffordshire on February 3rd, 1824, the son of a surgeon in that town, he studied medicine at Birmingham, and took the diplomas of M.R.C.S. and L.S.A. in 1845 and that of L.R.C.P.Edin. in 1859. He graduated M.D. St. Andrews in 1871. When his father, Dr. Thomas Underhill, retired from professional work he and his brother William continued the practice in Tipton. In 1873 he went to West Bromwich. He became president of the Birmingham and Midland Branch of the Association and member of the Council of the Birmingham Medical Institute. Dr. Underhill took great interest in public work in West Bromwich; in 1882, when that town secured the charter of incorporation, he was elected one of the first aldermen, and was the second to occupy the office of mayor (1884–5). He was already among the oldest of the county magistrates, and when living at Tipton he was one of the pioneers of the movement for the erection of the Dudley Guest Hospital, and was afterwards honorary surgeon for sixteen years. When he celebrated his golden wedding some years ago a cheque for £1,000 subscribed by his many friends was presented to him. The funeral took place at Tipton Parish Church on March 16th.

Dr. Robert James Horn of St. Faith's, Norwich, died on March 22nd rather suddenly, although some of his friends and professional brethren were aware that for many years past he had not enjoyed perfect health. Dr. Horn studied medicine at the Middlesex Hospital, and took the diplomas of L.R.C.P.Edin. and L.F.P.S.Glasg. in 1881. Seven years later he settled at St. Faith's, Norwich. In addition to an extensive private practice, he held several Poor Law appointments, and for some years was chairman of the parish council, where he distinguished himself by actively opposing unnecessary expenditure. He was also a searching and painstaking school manager. Dr. D. G. Thomson of the Norfolk County Asylum writes: "Ever since the reconstitution of the British Medical Association Dr. Horn has been my most trusty lieutenant—in the early days especially. He would never take office in the Division as president or secretary owing to his health, but he was on all committees, represented the Division on the Branch Council, and was a member of the Panel and Local Medical Committees for Norfolk; his death is a great loss to the Division."

Colonel Richard Patrick Ferguson, R.A.M.C.(ret.), died at Southsea on March 10th. He was born on March 13th, 1839, educated in the school of the Royal College of Surgeons, Ireland, and took the diplomas of L.R.C.S. and L.R.C.P.Edin. in 1860. Entering the army as assistant surgeon on March 1st, 1862, he became surgeon on March 1st, 1873, surgeon-major on March 1st, 1874, and surgeon-colonel on September 6th, 1892, retiring on March 13th, 1899. He served in the Bhutan war of 1864–65, and was present at the assault and capture of Bala, receiving the Indian frontier medal with a clasp; in the Afghan war of 1878–79; in the second division with the Peshawar Valley field force, medal; and in Egypt in 1882, medal and Khedive's bronze star.

Dr. William Louis Rodman, president of the American Medical Association, died in Philadelphia on March 8th in his fifty-eighth year. He graduated at Jefferson Medical College, Philadelphia, in 1879, and, after serving in the United States army for two years, he was demonstrator of surgery in the University of Louisiana from 1885 till 1893, and afterwards was professor of surgery in the Medico-Chirurgical College, Philadelphia, and in the Woman's Medical College of Pennsylvania. He was the author of numerous contributions to surgical literature.

Dr. Luis Comenge, who died recently aged about 60, was head of the health service and director of the municipal laboratory of Barcelona, and did valuable work in epidemics of cholera and bubonic plague in Spain and the Canary Islands. He enjoyed a considerable reputation among his fellow-countrymen as a writer on medical history and antiquities and the social and literary aspects of medicine.

Dr. Achilles Rose, of New York, who died on January 10th, aged 76, was born at Ruhla in Thuringia in 1839. After studying at Zürich and Jena he went to the United States, and graduated in medicine at the New York College of Physicians and Surgeons in 1872. He was an accurate scholar who included not only classical, but Byzantine and modern Greek in his range of study. He was well known by his advocacy of modern Greek as the right source of medical terminology whenever no suitable ancient root could be found. He was carried so far by his enthusiasm that he urged the adoption of Greek as the language of medical science; in this, however, he was a voice crying in the wilderness. Dr. Rose had for some years been engaged in the preparation of a new medical lexicon based on those principles. For his work in this field he was elected an honorary member of the Athens Academy of Medicine, and in recognition of his interest in the Greek language and history he received a decoration from the King of the Hellenes. Dr. Rose was the author of several works on modern Greek and medical onomatology; of a book entitled *Napoleon's Campaign in Russia, Anno 1812*, and of other works on the treatment of fever by continuous bathing and other therapeutic subjects.

Deaths in the Profession Abroad.—Among the members of the medical profession in foreign countries who have recently died are Dr. Rudolf Dohrn, for many years professor of obstetrics at Koenigsberg and head of the gynaecological clinic of that university, aged 79; Dr. C. Townshend Dade, consulting dermatologist to the Manhattan State Hospital, the Roosevelt Hospital, and other public institutions of New York, aged 56; Dr. Lajos Makara, professor of clinical surgery in the University of Klausenburg, aged 53; Dr. Boleslaw Wicherkiewicz, professor of ophthalmology in the University of Cracow, aged 68; Dr. Alexandre Moutier, of Paris, author of numerous writings on the application of d'Arsonval's discoveries on high-frequency currents in medical practice; Dr. Edmond Heckel, professor in the Medical School of Marseilles, founder and director of the Marseilles Colonial Institute, a corresponding member of the Institute of France, and a member of the Paris Academy of Medicine; Dr. Alzheimer, professor of psychiatry in the University of Breslau, author of many contributions to the pathology of mental diseases, and joint founder with Lewandowsky of the *Zeitschrift für die gesamte Neurologie und Psychiatrie*, aged 52; and Dr. T. Langhans, whose name is associated with the discovery of the giant cell, till recently professor of pathological anatomy at Berne, aged 76.

Medical News.

ON St. Patrick's Day the Irish Medical Schools' and Graduates' Association presented the Arnott gold medal to Captain W. Loughnan, R.A.M.C., of Dublin, for conspicuous gallantry in the field.

COLONEL CHARLES STONHAM, senior surgeon to the Westminster Hospital, left estate of the gross value of £24,865.

THE tenth triennial session of the Congress of American Physicians and Surgeons will be held at Washington on May 9th and 10th under the presidency of Professor W. S. Thayer.

A DISCUSSION on the rationale and practice of chemotherapy will be opened by Mr. J. E. R. MacDonagh in the Section of Dermatology of the Royal Society of Medicine on Thursday, April 13th, at 5 p.m., when a number of leading chemists are expected to be present.

A DENTAL department has been organized at the Angell Memorial Hospital of the Massachusetts Society for the Prevention of Cruelty to Animals at Boston. Treatment is to be provided for animals suffering from defective teeth.

THE publication of a new quarterly periodical entitled *Journal of Cancer Research* is announced. It is the official organ of the American Association for Cancer Research and is edited by Dr. Richard Weil of the Cornell University Medical School.

THE Women's Imperial Health Association, 7, Hanover Square, London, W., has printed a leaflet founded upon the memorandum on measles issued by the Local Government Board. It seeks to impress upon parents the importance of the proper medical treatment of measles in view especially of the complications and after-effects.

THE 150th anniversary of the foundation of the medical school of the University of Pennsylvania was celebrated by a dinner given by the Society of the Alumni of the school on February 4th. The school was founded by Dr. John Morgan in 1765, an event which marks the beginning of medical teaching in the United States.

WE learn from the *Medical Journal of Australia* that in consequence of the failure of attempts to obtain Government help in the furtherance of the scheme, a company has been formed by the members of the Cremation Society of New South Wales for the erection of a crematorium in the neighbourhood of Sydney. Among the provisional directors are the Hon. Dr. J. M. Creed, Dr. Foreman, and Dr. A. L. Kerr.

DR. SIMON FLEXNER was elected president of the American society for experimental pathology for 1916 at a meeting recently held in Boston. The society will hold its next meeting in New York in December next in combination with the other constituent organizations of the federation of American societies for experimental biology.

THE Physiological Society will issue next week the first number of a monthly number, the scope of which is sufficiently indicated by its title—*Physiological Abstracts*. It will contain abstracts of papers on physiology, comparative physiology, and biochemistry. It will be edited by Professor Halliburton, King's College, Strand, W.C., to whom reprints of papers should be sent. It will be published by Messrs. H. K. Lewis and Co., Ltd., 136, Gower Street, W.C., at an annual subscription of 25s., post free.

THE Natural History Museum, South Kensington, is now open to the public in part. The sections open daily are the central hall, containing special exhibits, including the large models of mosquitos, tsetse flies, and the parasites they convey; the north hall containing domesticated animals, and the galleries for birds, mammals, shells, and botany; most of these parts are also open on Sundays. Other galleries are open on alternate days; the reptile and insect galleries on Tuesdays, Thursdays, and Saturdays. On week-days the public is admitted to the parts named at 10 a.m. to 6 p.m. (April to August inclusive); on Sundays the hour of opening is 2 p.m.

THE Local Government Board has issued a circular letter dated March 23rd to boards of guardians setting out methods of applying the general principle adopted, in conjunction with the Army Council, in regard to the payment of compensation in respect of Poor Law institutions wholly, or in part, made use of for military purposes. The Army Council will not pay rent, or make any contribution in respect of existing capital charges, but will reimburse the guardians the whole of their authorized expenditure upon the occupied premises during the period of the military occupation, including the remuneration of all officers and servants employed in and about those premises.

THE present dearth of chauffeurs, coupled with the fact that 1,500 new motor vehicles are put on the road every month in the United Kingdom, has led the British School of Motoring, Limited, to transfer its instruction premises (formerly at Peckham Rye) to South Kensington. Among the speakers at a luncheon which preceded the formal opening was Sir W. Arbuthnot Lane, who laid stress upon the physical value of motoring as a profession for women. Motoring, with the varying positions it demanded, brought into play muscles which otherwise were often allowed to remain unexercised. He suggested that motoring would go some way towards solving the problem presented by the increase in the numbers of women who must necessarily remain unmarried.

AT the opening of the Italian field university (*Università castrense*) at San Giorgio di Nogaro, some four hundred medical students were present. The Rector (Professor Tusini) explained that its object is to give advanced students actually serving with the army the opportunity of continuing their studies in medicine and surgery. The university has its head quarters in the communal palace, the council chamber being used as a lecture room. There is a theatre for anatomical and surgical work with accommodation for five hundred students and a fully equipped *post-mortem* room. The teaching installation is completed by a separate building for instruction in mental diseases, and laboratories of bacteriology, stomatology, etc. The students are lodged in barracks.

A. N. RACHMANOW has reported (*Medizinskoye Obosrcniye*, 1915, Nos. 1–2) 2,586 cases of abortion observed by him in a lying-in home in Moscow. In comparatively aseptic cases all methods of treatment gave the same good results, with a slight advantage for instrumental interference. Quite different were the results in the infected cases. Those in which the ovum was removed manually suffered least; while those not interfered with suffered more, and most of all those submitted to instrumental treatment. That manual interference, and not expectant treatment, gave the best results appeared to depend not on the fact that the defending granulating surface was undisturbed, and a wide way opened for infection, but was due to the circumstance that with an instrument even the most experienced gynaecologist might leave some infected pieces of membrane behind, as an energetic curettage was always attended by the risk of rupturing the uterus. The author prefers manual treatment because much was learnt by the sense of touch in the finger, and because it rendered necessary greater dilatation, which provided better opportunities for drainage. He therefore recommends not aiming at scientific researches the following rational method of treatment to all persons and institutions: In non-infected cases shorten the process of abortion by operative treatment; in infected cases dilate to the maximum, and remove manually the ovum or its remains. The spoon should be used only when dilatation of the cervix for the admission of a finger is impossible.

The Chinese Recorder, which is the monthly periodical of the American Presbyterian Mission Press, and is published in Shanghai, devoted its issue for November, 1915, to the subject of medical education in China. It contains articles on the Rockefeller Foundation and medical education in China, by Dr. E. W. Merrins; on the China Medical Board, by Mr. Roger S. Green; on union medical work in Canton by Dr. Andrew H. Woods, and in Peking by the President of the Union Medical College, Dr. J. G. Cormack; on medical education in Nanking by Dr. Nathan Worth Brown, in Shanghai by Dr. J. C. McCracken; on the Union Medical College, Tsinanfu, by Dr. H. Balme; and on the Hunan-Yale Medical College as a Co-operative Institution with the Chinese, by F. C. Yen, M.D. These articles do not cover the whole ground, for there are at present 29 medical schools in China, 16 of which are missionary enterprises, 8 belong to the Chinese Government, and 5 are maintained by non-missionary foreigners. The editor, indeed, claims that the schools treated in this part of the *Recorder* are "sufficient to give an all-round view of the general problem of medical education"; but since the C.M.S. work at Hangchow, the enterprise of the U.F. Church of Scotland and of the Irish Presbyterians and Danes at Moukden, and the colleges at Hankow and Foochow are practically unconsidered, it is difficult to accept his assurance in full. One of the problems discussed is the language medium in which instruction is to be given—Chinese or English; but it seems to be more reasonable that a few English-speaking teachers should learn Chinese in order to instruct the many Chinese students than that all the latter should be compelled to learn English that they may understand their teachers.

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

THE telegraphic addresses of the BRITISH MEDICAL ASSOCIATION and JOURNAL are: (1) EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard. (3) MEDICAL SECRETARY, *Mediocra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish office of the British Medical Association is 16, South Frederick Street, Dublin.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

INCOME TAX.

T. A. B. H. has bought a practice, paying one-eighth of the premium down and the rest by quarterly instalments. He inquires whether income tax should be deducted from the quarterly payments.

*** If these payments constitute instalments of a predetermined purchase price, our correspondent has no right to deduct income tax; on the other hand, if the agreement for purchase of the practice provided in terms for payment of a lump sum and of an annuity for a period payable in quarterly amounts, then income tax is deductible. From the particulars furnished by our correspondent the case appears to fall into the former class. Land tax is payable unless it can be shown that it has been "redeemed" by payment of the capitalized value. The authorities usually require production of the redemption certificate as evidence of non-liability. "Exemption" is granted if the total income of the owner does not exceed £160.

LETTERS, NOTES, ETC.

LIEUTENANT T. B. JOBSON, R.A.M.C., War Hospital, Dartford, is anxious to obtain some human bones for use at a training school for R.A.M.C. men.

DR. JEPSON—and in this he supports the view expressed by the Health of Munition Workers Committee—writes to recommend that in every department or section of works where girls are employed there should be a woman head, and that it should be her duty to make a note about each girl under her, and in particular to arrange that they should have periodical periods of rest at the menstrual periods. He considers that lady doctors and women's societies might do even more for their own sex than they are.

LEPROSY AND FISH EATING.

DR. G. ARBOUR STEPHENS (Swansea) writes: James Howells, in one of his *Familiar Letters*, written on April 10th, 1622, from Trevere, states: "We are now in North Holland, where I never saw so many, among so few, sick of leprosy; and the reason is, because they commonly eat abundance of fresh fish." According to this letter, Sir Jonathan Hutchinson seems to have been corroborated as early as 1622.

MAGNESIUM SULPHATE LOTION IN CELLULITIS.

DR. ALBERT E. MORISON (Sunderland) writes: Lieutenant S. A. B. Paymaster has drawn attention to the above in the JOURNAL of March 11th. His findings corroborate those published by Dr. Tulloch and myself on the treatment of all septic wounds by this salt. The treatment of erysipelas by magnesium sulphate is of very old standing, and is mentioned in several textbooks on surgery published before the dawn of the Listerian era of antiseptic surgery. It was, of course, at that time used empirically; now we know as a result of the researches of Dr. Tulloch that its action is due not only to its hypertonic action on the tissues, but to the power it possesses of inhibiting the growth of streptococci and most of the granulated-negative forms of bacilli found in wounds. I would, however, suggest that the effect of the treatment is very much hastened and more efficacious, and the change of dressings is less frequently required, if a saturated solution of magnesium sulphate with 10 per cent. glycerine is employed. This we have found by numerous experiments gives the best results in septic wounds and infective conditions.

TRACHOMA IN U.S.A.

THE United States Public Health Service has established five hospitals for the treatment of trachoma in the three States of Kentucky, Virginia, and West Virginia. In the past fiscal year 12,000 cases have been treated, most of which have been cured; those in which a cure was not effected were so far improved as to be made harmless to other people. In addition to the hospital work, doctors and nurses have visited patients at their homes and given instruction as to the means of preventing the development and recurrence of the disease. Surveys were made in sixteen counties in Kentucky, especially among school children. Of 18,016 persons examined, 7 per cent. were found to have trachoma. Similar inspections in certain parts of Arizona, Alabama, and Florida showed that from three to six in every hundred children were affected.

PEPPER IN THE PROPHYLAXIS AND TREATMENT OF FILARIASIS.

MR. T. A. R. AIYAR, L.R.C.P.and S.Edin., L.F.P.and S.Glasg. (Sitiawan, Lower Perak, F.M.S.) writes: All classes of Indians indulge in pepper, and I can hardly imagine even a single class that does not consume it in some form or other. Notwithstanding this, filariasis is not an uncommon affection among them. This malady existed some three decades ago to an alarming extent, chiefly in seaport towns, where the sanitary conditions were very imperfect, and elephantiasis of the scrotum, leg, etc., was quite common. With improved sanitary conditions the disease has been practically stamped out from these towns. Still, in some rural areas *Filaria medinensis* is quite a common parasitic affection, and the sufferers here all partake of pepper. I have had some hundreds of cases of guinea-worms under my care and personal observation. In one case of the worst form of chyluria the sufferer was an Indian, who was ingesting pepper every day as a part of his daily rations. This man eventually died, and necropsy revealed obstructions of the various lymphatic channels with the ova of the mature parasites. I therefore conclude that pepper has no place in the armamentarium of drugs either as a prophylactic or remedial agent in this particular form of ailment.

HERPES OF THE PENIS.

MAJOR M. S. IRANI, I.M.S., writes: I have under treatment for the last six years a very obstinate case of neuralgic herpes of the genitals similar to one described by your correspondent in the Far East in the BRITISH MEDICAL JOURNAL of January 22nd, 1916. The patient is a well-built young man, aged 37, in good health, of active habits, a total abstainer, a non-smoker, and free from any specific disease or any hereditary taint. The complaint commenced over six years ago in a very insidious manner, the earlier attacks being very mild and very short. The neuralgic attacks came on at irregular intervals, at first once or twice a month but later more frequently, often two or three times a week, apparently without any cause or provocation; they lasted from a couple of hours to twelve, or on some occasions over twenty-four hours. The patient's attention was first drawn to the condition by the appearance of a small vesicular eruption on the prepuce. The severity of the attacks varied from slight hyperaesthesia or mild burning sensation to very severe neuralgic pains in the following sites—the skin of the scrotum, prepuce, the skin of the upper and inner part of either thigh, right gluteal region, and, on rare occasions, left heel; nerves affected—ilio-inguinal, genito-femoral, anterior cutaneus and medial calcaneal. More than one place was rarely affected simultaneously; the pain commencing in one place shifted to another within a short time, or it remained localized in one spot until it disappeared. The most peculiar feature of the case is that a day or two after the attack leaves the patient a very small crop of herpes appears, always on the prepuce without any regard to the site or sites attacked by neuralgia. It consists of not more than three or four small vesicles on an inflamed hyperaemic base, which ulcerate, producing small round ulcers with clean cut margins. In the earlier stages of the complaint these took two to three weeks to heal but latterly they heal in a week. The eruption is not painful. The attacks of late have become less frequent, there being often an interval of two months, and the severe type is less common. Medicinal treatment has made no difference in the frequency, duration, or severity of the attacks. The patient had met with a riding accident about eighteen months before he noticed this complaint. He was badly shaken but did not sustain any damage to any bones or organs, and was not incapacitated from work for more than three or four days.

I should be very grateful if any of your readers would make any suggestions for treatment or give information as to the pathological lesion, and references to literature on the subject.

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